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AGAINST DOGMA AND FREE-WILL

AND

FOR WEISMANNISM.

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AGAINST
DOGMA AND FREE-WILL

AND

FOR WEISMANNISM.

BY

H. CROFT HILLER.

SECOND EDITION.



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Dedicated,

AS A TOKEN OF ESTEEM,

TO J. F. NISBET, AUTHOR OF "THE INSANITY OF GENIUS" AND "MARRIAGE AND HEREDITY."

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PREFATORY NOTE TO FIRST EDITION.

SOME ingenious critic, after scanning the ensuing pages, may exclaim: here is a book against dogma, yet filled with dogma!

The writer's reply to such an exaggeration of fact would be: that the Dogma referred to in the title is the Dogma of ecclesiasticism; that, to dogma, merely as dogma, he has no objection; that he is even prejudiced in its favour, provided the dogma be corroborated by Fact; that he is quite content if his own dogma stands or falls with the evidence on which it is based.

List of works from which the principal quotations in this book have been extracted.

ALVIELLA (Count Goblet d'), Professor of the History of Religions at the University of Brussels. "Lectures on the Origin and Growth of the Conception of God, as illustrated by Anthropology and History."

ARNOLD (Matthew), Formerly Professor of Poetry in the University of Oxford and Fellow of Oriel College. "God and the Bible," and "Literature and Dogma."

BAIN (Alexander, LL.D.), Professor of Logic in the University of Aberdeen. "Mind and Body." 7th edition.

BASTIAN (H. Charlton, M.A., M.D., F.R.S.), Professor of Pathological Anatomy and of Clinical Medicine in University College, London; Physician to University College Hospital and to the National Hospital for the Paralyzed and Epileptic. "The Brain as an Organ of Mind." 4th edition.

DRAPER (John William, M.D., LL.D.), Late Professor in the University of New York. "History of the Conflict between Religion and Science." 21st edition.

FARRAR (J. A.), "Paganism and Christianity."

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FERRIER (David, M.D., LL.D., F.R.S., F.R.C.P.), Professor of Neuropathology, King's College, London; Physician to King's College Hospital and to the National Hospital for the Paralyzed and Epileptic. "The Croonian Lectures on Cerebral Localization."

LUYS (J.), Physician to the Hospice de la Salpétrière. "The Brain and its Functions."

MAUDSLEY (Henry, M.D., F.R.C.S.), Professor of Medical Jurisprudence in University College, London. "Responsibility in Mental Disease."

MOMERIE (A. W., M.A., D.SC., LL.D.), Late Fellow of St. John's College, Cambridge. Late Professor of Logic and Metaphysics in King's College, London. "Inspiration, and other Sermons."

MOORHOUSE (James, D.D.), The Right Reverend, Bishop of Manchester, "Dangers of the Apostolic Age."

NISBET (J. F.), "Marriage and Heredity," 2nd edition, and "The Insanity of Genius."

REDFORD (R. A., M.A., LL.B.), Professor of Systematic Theology and Apologetics, New College, Oxford. "The Christian's Plea against Modern Unbelief." 3rd edition.

RIBOT (Th.), "Heredity." 2nd edition.

SPENCER (Herbert), "First Principles." 5th edition.

WALLACE (Alfred Russel, LL.D., F.L.S.), "Darwinism."

WEISMANN (Dr. August), Professor in the University of Freiburg in Breisgau. "Essays upon Heredity and Kindred Biological Problems." Volume I., 2nd edition. Volume II., 1st edition. Edited by E. B. Poulton, M.A., F.R.S., F.L.S., F.G.S. Selmar Schonland, Ph.D., Hon. M.A. Oxon., and A. E. Shipley, M.A., F.L.S. "The Germ-Plasm." Translated by W. N. Parker, Ph.D., and Harriet Rönnfeldt, Ph.D.

To all the above-mentioned authors, the writer of this book tenders his sentiments of obligation. Though his own views may cause pain to some of these writers, and may be expressed in a manner apparently opposed to appreciation of their works, the opposition is merely apparent. The writer is not too obtuse to realize that error, as well as truth, may be honestly propounded with masterly ability; but, all the less, in that case, should he who believes he promulgates truth, scruple to use any deadly weapon at hand—only provided (would that pro-

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mulgators of "truth" had always observed this proviso) the weapon kills phantoms, but harms no bodies!

To those scientists whose works confirm, and have enabled him to forcibly formulate his own views, the writer is under an inestimable obligation. Especially he begs to thank Drs. Weismann, Luys and Ferrier, from whose labours the views expressed in this treatise derive that scientific authentication, without which, they would be merely as trustworthy as the views, say, of a modern philosopher!

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INTRODUCTION TO THE SECOND EDITION.

SINCE the first part of this work was published, a considerable amount of criticism, some eulogistic, some cautiously dissentient, some blindly abusive, has been directed at the author. He has been taxed with mis-applying the scientific verifications which he promulgates; with propounding untenable socio-political doctrines; with desiring to overthrow "morality" and religion. What, on the other side, he has been credited with achieving need not be here recounted.

Views tending to radically modify long-accepted conventionalities must arouse opposition and even blind resentment. The writer is fully assured that those critics who have "brains" and honesty of purpose will ultimately recall their strictures. Therefore he accepts with equanimity their present "canister" (these abusive critics, be it observed, manifest a greater partiality for wild shooting with "canister" than for exact aim with "round-shot" or "bullets"!).

On the other hand, the author is under obligation to some of the criticism because it has been the means of enabling him to further elucidate and establish certain propositions which, in the earlier treatise, were either discussed cursorily as being subsidiary to the main purpose, or, were not as fully expounded as they deserved. Such criticism was that which the writer fortunately provoked from the editor of the *National Reformer*, and to which criticism he was per-

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mitted to reply in that organ. He is sanguine enough to hope that the controversy, now placed, as fully as practicable, before the reader, may strongly tend to establish the writer's propositions among the intelligent public.

Again, as some of the main theses advanced in the earlier treatise are based on the researches of Professor Weismann, the author has been impelled to incorporate in this volume a sketch of Weismannism and two articles referring to that subject, which originally appeared in the *National Reformer*. It is hoped that the reader may thus be afforded a more coherent grasp of the newly-discovered biological facts than could be obtained from the necessarily incidental treatment accorded to the subject in the earlier treatise.

Finally, as a reply to those critics who have taxed him with assailing "morality," the author has added the short essay entitled "Social Expediency."

The writer will here express his obligation to Mr. W. Platt Ball for reading the ensuing biological chapters and offering courteous suggestions of which the writer has gratefully availed himself. He further has a high appreciation of the moral effect likely to ensue from the outspoken manner in which he has been supported by a scientist of Mr. Ball's eminence. Nor, on the other hand, can the writer deny himself the luxury of a little sentimental outpouring with regard to Mr. Robertson, whose unfailing courtesy, whose combative thoroughness, whose intellectual power, and, particularly, whose earnest criticism of propositions which, at present, the Press seems discreetly anxious to keep at arm's length, have rendered to the writer, a hard duty, the adequate denunciation of Mr. Robertson's fallacies. The writer can readily appreciate Mr. Robertson's zeal to

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maintain the subjective propositions for which he so strenuously contends as being essential to social advance. On the other hand, the writer feels assured that a man of Mr. Robertson's intellectual calibre will ultimately adapt himself to the conditions imposed by recent research, more especially, as these new conditions are inevitably destined to prevail and are not really antagonistic to Mr. Robertson's essential projects, but, on the contrary, are far better calculated to promote them than are the products of mere *a priori* ratiocination by which those projects have been, hitherto, to a large extent, supported.

The writer regrets that the *National Reformer* is about to expire. During the few months he has known of its existence, he has read it with more interest than any other periodical literature. He hopes that its successor, the *Free Review*, may maintain the high level of intellectual and literary excellence which has characterized the *National Reformer*.

September 9th, 1893.

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CORRIGENDA AND SUPPLEMENTARY NOTES.

Note to page 125, *as continuation of first paragraph :—*

With a refinement of diabolical ingenuity, it was even propounded that helpless babes were not exempt from these eternal tortures. Does not it arouse all the resentment in human nature to know that such lies as the following were foisted on the minds of grief-stricken mothers by a Church which professed to exemplify the doctrine of universal Love? "Hold most firmly, and by no means doubt, that little children, *whether they die before or after birth*, pass, without the holy sacrament of baptism, from this world, to be punished with the everlasting punishment of eternal fire." (St. Fulgentius.)

We can now treat this stuff with the contempt it deserves; but think of the thousands upon thousands of mothers who *believed* it! Think of the human agony represented by those few words, then ask yourselves whether that agony has been outweighed by the raptures of all the "saints" and "converted sinners" of Christianity.

Note to page 141, *as continuation of second paragraph :—*

Unless the bishop, as a true follower of Augustine, Calvin, and other vehicles of the revelation of vengeance, wishes us to believe that the Deity deliberately consigns certain creatures to perdition, we must infer that this "directive originating activity" is beyond the power and the knowledge of Deity: ~~otherwise~~, that the Creator is neither omnipotent nor omniscient. No verbal quibbles will enable us to escape this dilemma.

Page 67, *line* 18 :—

For Deldoeuf *read* Delboeuf.

Read, instead of text, page 71, *lines* 20-22 :—

If reminiscent and peripheral excitations contend and neither prevail, volition is not manifested: the individual hesitates. If this is a marked characteristic of the cerebral conformation, the individual is said to be timid, irresolute, too cautious.

Read, instead of text, page 121, *line* 24 :—

If it cannot fix human responsibility.

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AGAINST
DOGMA AND FREE-WILL.

INTRODUCTION.

THE writer's original aim was, in a few lines, to place those who might witness or read a certain stage-play, at his own standpoint, in respect to the psychological problem involved in one of his characters—Fenton.

One cannot argue with a colour-blind person about chromatics. The public are in much the same position with respect to certain psychical realities, as is the colour-blind man with respect to chromatics. Hence the writer intended, in a short preface to his play, to provide against inevitable misapprehension. However, as the subject widened out under treatment, he felt impelled to considerably diverge from his earlier intention. He realized that, to adequately express his views, a much more serious demand than originally contemplated must be made on the reader's attention, and that if such views represent truth, as, after mature reflection and inquiry, the writer believes they do, then it was his duty to help, as others are helping, to propagate them.

The world is now on the brink of an epoch-making renunciation of doctrines which, for centuries, have been the instruments of Nature in her work of evolution, but which, having served their purpose, are now destined to be thrown aside.

It must be evident to every earnest person who can

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recall his doctrinal convictions of twenty years ago, that time has played havoc with them; that the blind trustfulness which once rendered him a willing affirmer of dogmatic mystery, is now supplanted by disquieting doubts rendering him either a scoffer at, or merely a mechanical votary of his idol. These phases of mental condition represent its average contemporary character in relation to Dogma, and as Dogma, to the mass of mankind, through long-enduring custom, has represented the very essence of religion, the latter has naturally been prejudicially affected by the impending fall of Dogma. The mind of civilization is now awaiting a fresh revelation. This revelation Science is destined to afford.

In the ensuing pages we purpose accomplishing what, so far as we are aware, has not, under like conditions and in the same manner, been attempted. We purpose to demolish the hypothesis of "free-will" and the dogmatic assumptions based on that hypothesis. We shall endeavour to achieve our end by utilizing the latest scientific verifications, which we hope to place before the reader under new aspects and which we shall supplement by certain speculations not familiar to the general public, to the average scientist, or even to some philosophers. We shall meet the "free-will" advocate on his own ground; we shall grant his premisses, and we hope, by his own premisses, to demonstrate the utter fallacy of his conclusions.

The first research to which we shall devote attention will be Weismann's latest verifications respecting the origin of life and the factors of heredity. These go to the very root of organic existence, and must radically affect all our religious and sociological notions. Mr. Herbert Spencer's philosophy, based on the fallacy that extraneous influences may be transmitted hereditarily, will now need considerable modification, and we shall find that the reforming zeal so characteristic of contemporary society, is likely to develop unforeseen consequences.

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We shall next glance at Darwin's theory of Natural Selection. This accounts satisfactorily for the evolution of all types of organism, and, we shall try to show, is inconsistent with the prevalent conceptions of "free-will" and an anthropomorphic deity.

Incidentally, in the course of our examination of the various branches of scientific research bearing on our subject, we shall venture to expound, and, we trust, establish, certain ethical propositions of a novel and, we believe, vitally important nature. We hope to establish so firmly that the most sinuous verbal dexterity of opponents shall be powerless against our conclusions, the fact that the current notions of good and evil are radically false; that the conventional definitions of virtue and vice are entirely untrue; that real morality is as different a thing from the "morality" of Dogma as is ethereal vibration from what we sensually apprehend as light; that all the deductions dependent on these conventions are, in the not distant future, bound to be discarded by thinking men. We fully apprehend the gravity of these pretensions which we deliberately make, and the issue of which we confidently await.

As an inevitable inference from the new truth, it will become evident that what are euphemistically termed the rights of property are destined to suffer some hard rubs. As human faculties are entirely dependent on the accident of bodily conformation, society will soon decide that the material results of the successful exercise of such faculties belong rather to society than to the individual recipient of Nature's bounty. To what extent such reasoning will be carried into practice will depend on the needs of society and will vary with its fluctuating standards of expediency. The principle itself will be universally admitted.

We shall prove, we believe, to demonstration, that every phase of cerebral action involving thought and what we call volition, is as strictly a natural phenomenon, entirely

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dependent on organic factors, as is the circulation of the blood. We shall satisfactorily account to reason—if not to emotion—for every action of what it has pleased certain theorists to define as a supernatural attribute, by the same methods which these theorists would apply to explaining the action of steam on a locomotive. We intend that these methods shall as logically explain the phenomenon of mental, as of mechanical, energy.

In furtherance of this purpose, we shall have to direct the reader's attention to the latest verifications of scientific psychology, a due comprehension of which will enable him to form the only possible rational conception of what it has hitherto been the business of metaphysics to involve in a hopeless maze of fallacious verbiage. Having considered all the departments of cerebral activity, we shall specially devote ourselves to an attack on dogmatic pretension, the absurdity of which we hope to effectually demonstrate.

In the course of our work we shall be compelled to record a protest against some inconsistencies in the procedure of certain eminent scientists and thinkers, who, while furthering the work of demolition, have shrunk from the logical issue of their own achievements. As seeking truth only, and as realizing to what extent truth has hitherto been shackled by the devices of the partisans of fallacy, we feel bound to deprecate any concession to the adversary, under whatsoever guise that concession may appear. We feel that the ground must be cleared of all obstructions to an accurate perception and a final settlement of the great issues: are the doctrines of "free-will" and an anthropomorphic deity longer tenable by thinking men?

If we may seem occasionally to lapse into an impetuosity of treatment of our subject, unusual in logical controversy, it is because we believe that the advocate is the best fighter against popular prejudice. Our work aims at arousing society from a condition of lethargic *insouciance* towards exploded fallacy, to an intelligent appreciation of a newly

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acquired truth. There being no reason why the emotive should not help truth as it has helped Dogma, we have endeavoured so to combine the judicial with the rhetorical appeal that each may touch the mind specially responsive to its influence.

It will be advisable here to define the meanings we attach to three terms which, being concise and expressive, will be freely used in the course of this treatise. By "Nature" we mean, not a metonymical confusion of cause and effect involving personification of the Cosmos, but, the evolutionary method, so far as it has been ascertained by Science, of that mysterious Energy behind the universe. We trust that the reader will bear in mind this definition, as a loose and utterly untenable significance, inducing trains of thought diametrically opposed to any reliable process of inquiry, is frequently attached to the term.

By "Truth" we mean a conclusion verified by reason apart from emotion.

Truth, as concerns humanity, can only be measured by consciousness. There may be, and probably there is, truth outside consciousness; but if it cannot be authenticated by human apprehension, that truth is beyond the range of practical consideration. When man's sensibility impels him towards such problematical truth, the impulse merely induces a subjective conclusion absolutely derived from anterior subjective conclusions. Generations of men adopted the subjective conclusion that the sun moved round the earth; even now, mere sensibility inclines us to adopt the illusion which only reason and experience enable us to discard. The human being untaught from birth the traditions of his time and country could not generate the emotional conclusions of his fellow-men. These he acquires solely through tutelage. Naturally, he adopts what error is inherent to those conclusions. As all our nineteenth-century sensibility is evolved from the sensibility of the first man, could we believe that this first man was the

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perfect being designated by Dogma, we might venture to infer that our sensibility was the reminiscence of some superior faculty, and we might honour accordingly its occasional transcendentalism. However, Science has placed beyond doubt the fact that this first man was scarcely distinguishable from the nineteenth century orang-outang! So we cannot say much for the pedigree of our sensibility.

Everything, in a sense, is, to the individual, truth, to which his sensibility impels him: the disordered visions of the lunatic, the dreams of the sane man, the distorted chromatics of the colour-blind, are all, to the individuals, truth; but they are fallacy to the collective normal reason and experience, and these are the only standards by which humanity, in the aggregate, can discriminate between truth and fallacy.

In the course of this work we hope to clearly define reason, and to demonstrate its claim to override mere sensibility as a guide to certain truths which it is customary to relegate to the determination of this sensibility.

Language is the only means by which reason can conceive or express truth. What we vaguely apprehend beyond the expressive power of language may be truth, or the reverse. Whether truth or fallacy, it is outside the domain of reason, and consequently cannot be identified as one or the other.

Truth is occasionally felt by sensibility before it is apprehended by reason. Then, it can only be recognized as truth, after confirmation by reason.

All truth within the grasp of humanity is transmuted reality. As this transmutation is a fundamental condition imposed by Nature, it follows that all truth within our apprehensive capacity must be merely relative. Nevertheless, such relative truth is adequate to the needs of humanity; man need not seek to transcend it.

In this treatise we shall accordingly consider nothing Truth which may not be expressed by language and con-

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firmed by reason and experience. Restricted by these limitations, we hope to carry the reader beyond even the realms of emotion; we shall render apparent to his reason more than Dogma has tried to picture to his sensibility. By the "Law of Nature," we mean the conditions under which that orderly sequence of phenomena prevalent from the beginning of the universe, occurs. This law being demonstrably the very opposite of a mere chance sequence of events, we are constrained to consider it the effect of design; and, as it is, so far as human reason can apprehend, absolutely constant in operation, we are warranted in basing the widest deductions on its unvarying and universal operation and in rejecting any assumption of exception from its influence. Moreover, when we can explain a phenomenon by the operation of this law, it is evidently absurd to gratuitously import an outside factor to account for such phenomenon. This, we intend to prove, is what mankind have, for several ages, been doing.

The object of this work is not to destroy men's faith in the supernal. Rather it is to establish that faith. We wish to drive men to the only supernatural which, under the present conditions of knowledge, is possible as an object of real belief, to the mind of rational humanity. That supernatural is the Supernatural of Science. We shall try to render the Supernatural of Science so apparent to men's understanding that it becomes the one cogent fact of their existence, dwarfing into insignificance all their other actualities. We aim at the destruction of cant, pretence, and delusion. We fight for honesty, reason, and truth. If, in prosecuting our enterprise, we hurt many susceptibilities, we must plead that our cause is greater than the emotions of mankind, and that "Truth fears nothing but concealment."

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CHAPTER I.

THE only systematic methods of abstract inquiry known to the world originated from two Greek philosophers—Plato and Aristotle. Plato's system deduced from a primitive idea to particulars; Aristotle's induced from particulars to general principles. Hence they may respectively be termed deductive and inductive methods. One was essentially based on the imagination; the other on reason. Platonism reached its conclusions rapidly, but often inaccurately; Aristotelianism, slowly, but accurately. One was brilliant, but delusive; the other unpretentious, but sure. Dogma is an example of the former; Science, of the latter method.

To the deductive principle, prematurely adopted, mankind owe most of the fallacies by which they have been transiently dominated; to the inductive, all the verities destined for ever to sway the human mind.

The greater the number of isolated facts we have collected tending to establish a general conclusion, the more assured we may feel of the truth of that conclusion. If we have accumulated an overwhelming number of facts, and all these facts tell the same tale, we may then reasonably assume that such tale is absolute Truth (always bearing in mind that this absolute truth is only absolute so far as concerns human power of apprehension, and that with absolute truth apart from this power of apprehension, we need not here concern ourselves), and we

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may confidently predict from this Truth, the establishment of further, as yet unverified, conclusions. This is the Aristotelian method which, accordingly, embraces the Platonic, but with strict limitations. In thus predicting, we use the Platonic method which is then admissible, because, by sufficient induction, we have established an absolute verity.

Step by step, proceeding on these principles, rigidly rejecting what is unconfirmed by induction, Science has accumulated all the exact knowledge we now possess.

Let us see how far these methods will carry us in trying to solve some problems of fundamental interest to mankind. Let us see whether by induction from various sources of knowledge we can show that Dogma is a guide such as no rational man would trust in the ordinary affairs of life.

Lamarck, a French naturalist, propounded a theory that acquired qualities were transmissible by heredity. On the assumed truth of this theory has been built up all the socialistic speculation of modern times. Among other deductions made from it was one that the effects of education and other extraneous influences would be grafted into the nature of posterity. Lamarck's theory has been recently demolished.

It is now conclusively shown that extraneous influences only affect the individual immediately subjected to them; that, to permanently affect the type through heredity, the germ-cell must be modified *before the individual is born, and that no such modification can ensue from any influences affecting the individual during life.*

The research which has yielded these momentous results is that devoted to the infinitely little. The microscope, in conjunction with splendid scientific ability and heroic determination to probe, so far as she will permit, the mystery of Nature, has revealed the theory of "The continuity of the germ-plasm," by which Weismann principally,

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and Galton in a secondary degree, have demolished the assumption that extraneous influences affect the type.

Science, unlike Dogma, is quite ready to renounce her most highly-prized convictions so soon as facts disprove them. She would, under similar circumstances, renounce the theory of gravitation as readily as she has Lamarck's.

Weismann's theory is based on these facts.

The original of terrestrial organic life was a one-cell being, with no faculties but those of assimilation and reproduction. This creature could not be said to die. One divided into two exactly alike. "In this way countless numbers of individuals arise, each of which is as old as the species itself, while each possesses the capability of living on indefinitely by means of division. . . . Each individual of any such unicellular species living on earth to-day is far older than mankind, and is almost as old as life itself. (Weismann on "Heredity.")

After ages, a number of these cells clustered together, and as a result of relativity of position, lost their homogeneity. Some were better adapted to nourishing, others to reproducing. From this division of function arose a differentiation of groups into somatic and reproductive. Very soon, the somatic surpassed in numbers the reproductive cells, and through the principle of division of labour, became more diversified in tissue. Concurrently with these changes, the somatic cells lost the power of reproducing the whole organism, and only the reproductive cells proper retained this function. Thus arose the germ-cell, the potential reproducer of all the other cells of the organism. This germ-cell retains the potential immortality of the primal cell which the others have lost. This potential immortality does not mean that such cells cannot be killed—merely that they have no natural death. They die when the containing organism dies, but in the understood sense, this is accidental death to the germ-cell.

Through this germ-cell, and through it only, can the type

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be hereditarily affected. No influence, other than its own spontaneity, can modify it. Through such spontaneous change, under the law of Natural Selection, have been evolved all the different organisms peopling, or which have peopled the globe.

"I believe that heredity depends upon the fact that a small portion of the effective substance of the germ, the germ-plasm, remains unchanged during the development of the ovum into an organism, and that this part of the germ-plasm serves as a foundation from which the germ-cells of the new organism are produced. There is therefore continuity of the germ-plasm from one generation to another. One might represent the germ-plasm by the metaphor of a long creeping root-stock from which plants arise at intervals, these latter representing the individuals of successive generations. Hence it follows that the transmission of acquired characters is an impossibility, for if the germ-plasm is not formed anew in each individual but is derived from that which preceded it, its structure, and above all its molecular constitution, cannot depend upon the individual in which it happens to occur, but such an individual only forms, as it were, the nutritive soil at the expense of which the germ-plasm grows, while the latter possessed its characteristic structure from the beginning, viz. before the commencement of growth. But the tendencies of heredity, of which the germ-plasm is the bearer, depend upon this very molecular structure, and hence only those characters can be transmitted through successive generations which have been previously inherited, viz. those characters which were potentially contained in the structure of the germ-plasm. It also follows that these other characters which have been acquired by the influence of special external conditions, during the lifetime of the parent, cannot be transmitted at all." (Weismann.)

All multicellular organisms are derived from eggs.

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These eggs are of two classes: sexual and asexual, or parthenogenetic. In other words: one class requires, in order to generate a being, fertilization by the male nucleus, or spermatozoon; the other requires no fertilization. Each egg, of both classes, contains a substance called germ-plasm, from which the egg proceeds through certain phases of growth peculiar to itself, and then, having reached maturity as an egg, is ready to develop in another manner: into an embryo. The substance into which a part of the germ-plasm changes to cause the specialized egg-growth, is called ovogenetic nucleo-plasm. As soon as the sexual egg has reached maturity, it makes two nuclear sub-divisions of itself. These two sub-divisions are respectively composed of germ-plasm and ovogenetic nucleo-plasm, and are expelled from the egg as polar bodies. The first expulsion is of ovogenetic nucleo-plasm; the second, of germ-plasm. The significance of these two expulsions was an unsolved enigma, until Weismann discovered the solution. Here it is. When the histological development of the sexual egg is completed, the ovogenetic nucleo-plasm, into which one part of the original germ-plasm has changed, has done its work, and, if retained, would hinder the operation of the remaining germ-plasm in evolving the embryo. Accordingly, as above remarked, the ovogenetic nucleo-plasm is expelled from the sexual egg, as the first of the two polar bodies. There is still the second expulsion to account for. Before Weismann had discovered the true reasons, eminent embryologists, such as Minot, Balfour, and Van Beneden, supposed that the expulsion of both bodies occurred merely to get rid of the male elements of the assumed hermaphrodite female egg-cell. Weismann has demolished this assumption by various objections fatal to it, and by showing that the first expulsion occurs for the above-mentioned purpose of getting rid of the ovogenetic nucleo-plasm, and that, with the second expulsion, as many different kinds of idioplasms, carrying hereditary

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tendencies, are expelled, as are afterwards introduced by the entry of the male, or sperm-nucleus. This second expulsion thus ensures that half of the father's and half of the mother's hereditary tendencies are transmitted to the embryo. But, these halves of each parent's hereditary tendencies are, themselves, infinitely varied, that is: they do not, at successive acts of reproduction, combine the same specific tendencies. The chances are infinity to one against the same specific tendencies coalescing in any two halves of parent cells. Hereditary difference in offspring is thus conclusively explained by the expulsion of polar bodies from sexual eggs.

The significance of the one expulsion from parthenogenetic eggs is that the ovogenetic nucleo-plasm only is eliminated. As no modification of plasm takes place in such eggs by interchange as in sexual reproduction, we see why the latter must ensure continuous variation and consequent potential adaptability and vigour of species; and why parthenogenesis must entail the reverse: sameness of offspring and resulting inadaptability and tendency to typical extinction.

. This hypothesis has not yet attained the character of mathematical demonstration; biological science is not yet in the condition to render possible such a result. Nevertheless, the theory is essentially different from dogmatic assumption, inasmuch as it is a natural growth from a firm basis of experiment and actual observation of phenomena. It has none of the character of a subjective conclusion, but is a true scientific discovery developed by deduction from a vast accumulation of ascertained facts. If it were irreconcilable with but one of these facts, it would be at once discarded. The whole of Science has the amplest opportunity of scrutinizing the minutest details of this new revelation, and of detecting any flaw in its armour of truth. So far, although the most eager attempts have been made in this direction by the acutest scientific intellects of the age, Weismann's theory stands firm as the fundamentally

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true explanation of facts, the significance of which had previously eluded the mind of man.

"The ideas developed in the preceding paragraphs lead to remarkable conclusions with regard to the theory of heredity,—conclusions which do not harmonize with the ideas on this subject which have been hitherto received. For if every egg expels half the number of its ancestral germ-plasms during maturation, the germ-cells of the same mother cannot contain the same hereditary tendencies, unless of course we make the supposition that corresponding ancestral germ-plasms are retained by all eggs—a supposition which cannot be sustained. For when we consider how numerous are the ancestral germ-plasms which must be contained in each nucleus, and further how improbable it is that they are arranged in precisely the same manner in all germ-cells, and finally how incredible it is that the nuclear thread should always be divided in exactly the same place to form corresponding loops or rods,—we are driven to the conclusion that it is quite impossible for the 'reducing division'" (division of the nuclear rods, so that different ancestral plasms are distributed to each product of division. The reverse process is called "equal division." In this the nuclear rods split longitudinally, thus ensuring that similar ancestral plasms go to each product of division) "of the nucleus to take place in an identical manner in all the germ-cells of a single ovary, so that the same ancestral germ-plasms would always be removed in the polar bodies. But if one group of ancestral germ-plasms is expelled from one egg, and a different group from another egg, it follows that no two eggs can be exactly alike as regards their contained hereditary tendencies: they must all differ." (Weismann.) A similar reduction, but brought about in a different way, of ancestral germ-plasms, also takes place in the sperm-cell (male cell).

There is one important reservation to be observed in assuming this renunciation of the Lamarckian theory. In the earliest unicellular organisms which reproduce them-

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selves by division into two identical halves, the Lamarckian principle would operate. In such organisms, extraneous influences are capable of hereditarily altering the succeeding generation, because, in them, there is no distinction between body-cell and germ-cell: any external influence changes the entire individual, which being nothing but reproductive element, must necessarily transmit the modification. By this fact, it is possible to satisfactorily account for the primal individual differences which laid the foundation for that infinite system of permutation which began to operate as soon as sexual supplanted asexual reproduction, giving scope for that adaptive energy, which, as explained by Darwin's theory of Natural Selection, accounts for all the species of organisms which exist or have existed under the conditions of sexual reproduction. There can be no adaptation, in the Darwinian sense, among parthenogenetic or asexual organisms which are bound to reproduce only those hereditary differences which existed in the originals of the type. All such species, according to Weismann, are doomed to extinction, because they cannot adapt themselves to new conditions and form new species. The true significance of sexual reproduction is that variability absolutely depends on it: only by it can a species accommodate itself to new conditions of life. "We are thus driven to the conclusion that the ultimate origin of hereditary individual differences lies in the direct action of external influences upon organism. Hereditary variability cannot, however, arise in this way at every stage of organic development, as biologists have hitherto been inclined to believe. It can only arise in the lowest unicellular organisms; and when once individual differences had been attained by these, it necessarily passed over into the higher organisms when they first appeared. Sexual reproduction coming into existence at the same time, the hereditary differences were increased and multiplied, and arranged in ever-changing combinations." (Weismann.) Applying this

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theory to man, we can readily account for all the resemblances, differences, reversions to ancestral characteristics in different individuals of the same family, and explain why no individual is an exact copy of another. The male and female idio-plasms are combined in each act of reproduction, vary in intensity at different times, and each plasm contains the hereditary qualities of numerous antecedent plasms, each of which was, itself, similarly conditioned. The number of generations which the specific hereditary tendencies of the first generation can influence is not exactly determined. Weismann states that certainly more than six are so affected.

"When we remember that, in the tenth generation, a single germ contains 1024 different germ-plasms, with their inherent hereditary tendencies, it is quite clear that continued sexual reproduction can never lead to the reappearance of exactly the same combination, but that new ones must always arise. . . . In one child the characters of the father may predominate, in another those of the mother, in another, again, those of either the grand-parent or great-grand-parent. . . . We are thus led to the conclusion that even in a few sexually produced generations a large number of well-marked individuals must arise; and this would even be true of generations springing from our hypothetical species, assumed to be without ancestors, and characterized by few individual differences. But, of course, organisms which reproduce themselves sexually are never without ancestors, and if these latter were also propagated by the sexual method, it follows that each generation of every sexual species is in the stage which we have previously assumed for the tenth or some much later generation of the hypothetical species. In other words, each individual contains a maximum of hereditary tendencies and an infinite variety of possible individual characters. In this manner we can explain the origin of hereditary individual variability as it is known in man and the higher

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animals, and as it is required for the theory which explains the transformation of species by means of natural selection." (Weismann.)

It will be seen that this theory rejects any possibility that the transitory effects of an individual's life should modify his descendants, who can only be influenced through the parent, by those ancestral tendencies inherited by the parent which, again, in the children, may assume new forms of outward manifestation. Thus, the constitutionally predisposed drunkard does not transmit to his posterity a specific tendency to become drunkards. What he does transmit is an innate nervous idiosyncrasy which, in his case, has eventuated in the special vice, but which may, in his descendants, display itself in any one of a great number of unsound predispositions. The drunken father may have an imbecile, gouty or phthisical son, who, nevertheless, may be entirely free from his father's peculiar tendency. As each person contains a vast number of hereditary tendencies, it will be understood how almost impossible it must be to discover an individual absolutely free from congenital taint. Again, it will be seen that the only way to eliminate unsoundness from humanity, is to base marriage on physical fitness: to apply to it the same scientific principles which we apply to perfecting a breed of brutes. This will probably be impossible as long as society exists, and it is not at all certain that compensating disadvantages would not accrue from any such attempt to remodel humanity. Nevertheless, there can be no doubt as to the advisability of greater discrimination than at present prevails. Strong influence should be exerted to prevent the union of members of families in which pronounced and similar classes of innate degeneration exist.

We thus see that all organisms have originated from one such unicellular being as that above referred to. All the different types have been produced by spontaneous variations fixed by the operation of the law of Natural Selection

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and Survival of the Fittest acting through immeasurable periods. This law of Natural Selection was proved by Darwin's phenomenal industry and ability in collecting instances of the effects of spontaneous variation and natural surroundings on organism, and in formulating a scientific theory from his observations. As the theory is found to account satisfactorily for every variation, it is accepted by Science as a fundamental truth, such as Newton's law of Gravitation. Wallace and others have further developed and established Darwin's theory, proving that the discoverer himself had underestimated the universality of its operation.

As Natural Selection accounts for all the effects previously attributed by Lamarck to use and disuse, or the inheritance of acquired qualities, it only needed Weismann's later verification of "The continuity of the germ-plasm" to give the final blow to the Lamarckian theory which Science has now discarded.

Eyes, ears, teeth, nose, brain, nerve, stomach, liver, heart, lungs, kidneys—every difference, however minute, in colour or structure of every animal or vegetable organism—have been evolved under the law of Natural Selection and Survival of the Fittest: otherwise the preservation of favoured races in the struggle for life. "The point I wish especially to urge is this. Before Darwin's work appeared, the great majority of naturalists, and almost without exception the whole literary and scientific world, held firmly to the belief that species were realities, and had not been derived from other species by any process accessible to us; the different species of crow and of violet were believed to have been always as distinct and separate as they are now, and to have originated by some totally unknown process so far removed from ordinary reproduction that it was usually spoken of as special creation. There was, then, no question of the origin of families, orders, and classes, because the very first step of all, the origin of species, was believed to

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be an insoluble problem. But now this is all changed. The whole scientific and literary world, even the whole educated public, accepts, as a matter of common knowledge, the origin of species from other allied species by the ordinary process of natural birth. The idea of special creation or any altogether exceptional mode of production is absolutely extinct!" (Wallace.)

We know what Dogma has to say about death. Now, let us hear Science. According to the latest biological research, the natural tendency of all the higher organisms is to as short individual life as is compatible with the preservation of species. The individual is of no account; only the type concerns Nature. Assuming that the origin of hereditary disease was injury to the unicellular organisms from which all others sprang, and that such injury, metamorphosed in the later types, by heredity, has become the different forms of hereditary disease which affect organism, we have a clear explanation of the origin of such disease, and incidentally, of one form of death. Nevertheless, this is not normal death. Apart from artificial conditions of existence, disease, hereditary or non-hereditary, is a comparatively trifling cause of death. It is only when natural conditions are modified by artificial arrangements, that we find disease an important factor in causing death. Thus, in man and domesticated animals, disease tends to become more and more the arbiter of individual existence. The reason is that these artificial oppose the natural conditions which suffice to preserve the type in its greatest efficiency by eliminating the defective individuals, which perish by more expeditious agencies than disease.

Weismann, by incontrovertible evidence and reasoning, shows that natural life, in cases where the animal does not protect its young, is proportionate to the period of reproductive energy. Shortly after that ceases the animal dies. This has the force of an axiom: Nature wants normal individual life as short as possible compatibly with typical

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integrity. It will be seen that man, by his efforts to preserve inefficient organism, directly opposes Nature. This crux, sooner or later, will have to be faced by society. It seems the most perplexing and, in some respects, the most important question, now before civilized communities. The more artificial we become, the more able we are and the more we seem to desire to preserve the "unfit" organism which, again, tends to multiply its own defects in posterity. How will this end? Nations are composed of individuals; individual degeneration means national decay and extinction. Are we now helping forward our dissolution by preserving the "unfit"? Time will answer. Perhaps Nature will evolve a remedy for the physician's remedies!

Natural death, according to Weismann, originated in the earliest multicellular organisms, when the somatic cells had begun to form the bulk of tissue in the creature. The reasoning by which this is established is too technical and involved to be discussed here, but the reader may safely accept Weismann's conclusion. "Probably at first the somatic cells were not more numerous than the reproductive cells; and while this was the case, the phenomenon of death was inconspicuous, for that which died was very small. But as the somatic cells relatively increased, the body became of more importance as compared with the reproductive cells, until death seems to affect the whole individual, as in the higher animals, from which our ideas upon the subject are derived. In reality, however, only one part succumbs to natural death, but it is a part which in size far surpasses that which remains immortal,—the reproductive cells." (Weismann.)

As already stated, this death which is natural to the somatic cells, involves the reproductive cells in accidental death. Just as these latter, in a unicellular organism might be crushed to death, in spite of their potential immortality, so, in a multicellular being, they die, accidentally, through

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the death of the somatic cells. Weismann thus sums up his theory of Life and Death :—

"1.—Natural death occurs only among multicellular beings; it is not found among unicellular organisms. The process of encystment in the latter is in no way comparable with death.

"2.—Natural death first appears among the lowest Heteroplastid Metazoa, in the limitation of all the cells collectively to one generation, and of the somatic or body-cells proper to a restricted period; the somatic cells afterwards in the higher Metazoa came to last several and even many generations, and life was lengthened to a corresponding degree.

"3.—This limitation went hand in hand with a differentiation of the cells of the organism into reproductive and somatic cells, in accordance with the principle of division of labour. This differentiation took place by the operation of natural selection.

"4.—The fundamental biogenetic law applies only to multicellular beings; it does not apply to unicellular forms of life. This depends on the one hand upon the mode of reproduction by fission which obtains among the Monoplastides (unicellular organisms), and on the other upon the necessity, induced by sexual reproduction, for the maintenance of a unicellular stage in the development of the Polyplastides (multicellular organisms).

"5.—Death itself, and the longer or shorter duration of life, both depend entirely on adaptation. Death is not an essential attribute of living matter; it is neither necessarily associated with reproduction nor a necessary consequence of it.

"In conclusion, I should wish to call attention to an idea which is rather implied than expressed in this essay :—it is, that reproduction did not make its appearance coincidently with death. Reproduction is in truth an essential attribute of living matter, just as is the growth which gives rise to it.

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It is as impossible to imagine life enduring without reproduction as it would be to conceive life lasting without the capacity for absorption of food and without the power of metabolism. Life is continuous, and not periodically interrupted: ever since its first appearance on earth, in the lowest organisms, it has continued without break; the forms in which it is manifested have alone undergone change. Every individual alive to-day—even the very highest—is to be derived in an unbroken line from the first and lowest forms." (Weismann.)

The importance of these verifications cannot be overestimated. They upset all our preconceived sociological ideas, and reach the root of metaphysical doctrines of the highest moment to mankind.

Much of Mr. Herbert Spencer's teaching is based on the assumption that acquired qualities are transmissible. He supposes that a nation may be "modified *en masse* by transmission of the effects" of its institutions and customs. But, all such reasoning has now its foundations knocked away by Weismann, who has examined, in detail, the instances previously supposed to illustrate such transmission, and has clearly shown that they are quite explicable by the effects of natural selection. Darwin, also, was under the influence of the old illusion. He did not foresee its demolition, to the consequent great advancement of his own theory. "I, for one, frankly admit that I was in this respect under the influence of Darwin for a long time, and that only by approaching the subject from an entirely different direction was I led to doubt the transmission of acquired characters. In the course of further investigations I gradually gained a more decided conviction that such transmission has no existence in fact . . . But if the transmission of acquired characters is truly impossible, our theory of evolution must undergo material changes. We must completely abandon the Lamarckian principle, while the principle of Darwin and Wallace—viz. natural

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selection, will gain an immensely increased importance." (Weismann.)*

* Since the above was written, the second volume of Professor Weismann's translated lectures has appeared. I might have expunged the account given above of the professor's earlier conclusions and substituted the results made public in the latest lecture, dated September 12th, 1891, and entitled "Amphimixis, or the Essential Meaning of Conjugation and Sexual Reproduction." However, I prefer to retain the first account, for reasons stated by the professor, who, in referring to his later discoveries, remarks: "The fourth and last essay is not only the longest, but the one to which I attach the chief importance, because my views as to the essential meaning of so-called sexual reproduction, and the allied process of conjugation in unicellular organisms reach their final form in it, having been reconstructed on the basis of various new discoveries. I believe that I have solved, at any rate as regards the main points, the problem of the enigmatical double extrusion of polar bodies from the animal egg, and have explained why only a single division of the nuclear substance does not take place. I hope, furthermore, that I have thus confirmed my views upon the general significance of so-called sexual reproduction—as a means of producing hereditary individual variations, and for arranging these variations in ever fresh combinations. My hypotheses have been at times severely handled" (by Weismann himself) "when shown to be incorrect by the discovery of new facts,—even when these latter were themselves founded on my views. My explanation of the formation of polar bodies by the egg was at first wrong, then only partially right, and claims to be correct only in the concluding essay. Let who will reproach me, I am not ashamed of this error; on the contrary, I regard it with a certain satisfaction, for I believe it pointed the path to truth. I have left it unchanged in the essays of the first volume, not only for this reason, but chiefly because it is, I think, of great interest to trace the development of a scientific truth. Hypotheses, even when not absolutely right, may be of value in advancing our knowledge, if only they are relatively right, *i.e.* when they correspond with the state of existing knowledge. They are like the feelers which the short-sighted snail stretches forth on its darkened path, testing this way and that, and withdrawing them and altering its route as soon as they come across any obstacle; just as an unyielding fact may show that we are on a wrong road. Rome was not built in a day, and no scientific truth is at once revealed without a prolonged previous history made up of mingled truth and error. The last word has not yet been spoken on the subject dealt with in these essays; but if we remember the complete obscurity which, only ten years ago, surrounded everything which is now clearly revealed in the final essay, we shall not be able to refrain from an inward feeling of satisfaction." (Weismann.)

If we contrast the above with Dogma's "inspired" protestations, we may readily perceive why the modest methods of Science are destined to dominate

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One of the first convictions likely to strike us after a careful survey of the theory and its verification, is that efforts to remodel humanity by means of education, and the various devices of would-be reformers, must fail to achieve their purpose. We may as well try to stay the tide with a mop, as expect, by artificial measures, to anticipate Nature. All our board-schools and moralizing experiments have not extirpated a single innate characteristic from a single human being. The most that may be reasonably conceded for such methods is that they may, when natural susceptibility to their influence exists, induce the individual to try to conceal his defects. Yet such effect will rarely prevail against counteracting circumstances. Then, the latent potentiality will assert itself. What may be called hothouse virtue may be cultivated.

the mind of humanity and supersede the pretentious charlatanry of so-called revelation.

In the later lectures, Weismann has further established his position against the Lamarckian doctrine of inheritance of acquired qualities. This may now be considered as outside the range of practical science: it is a dead theory. What Weismann has now modified is his earlier explanation of the two polar expulsions from sexual, and the one expulsion from parthenogenetic, eggs. It is now proved that no expulsion of "ovo-genetic nucleoplasm" takes place from sexual eggs, but, that the two extrusions, as well as the one extrusion from asexual eggs, are of germ-plasm. The significance of the two separate expulsions in sexual eggs is to secure the greatest possible diversity in the plasms carrying hereditary tendencies. Weismann has also further advanced his position against the older-fashioned theory of a "male-principle" and a "female-principle." No such things exist. Fertilization is not dependent on the entry of a "male-principle" into a "female-principle." One nucleus enters another, but not in relation to reproduction, as cause, merely as a secondary adaptation ensuring variability. "I maintained that the nucleus of an ovum" (so-called female-principle) "might be fertilized as fully by the nucleus of another ovum —*i.e.* might be rendered equally capable of development—as the nucleus of a spermatozoon" (so-called male-principle). "The passage in which I advocated this view runs as follows:—'If it were possible to introduce the female pronucleus of an egg into another egg of the same species, immediately after the transformation of the nucleus of the latter into the female pronucleus, it is very probable that the two nuclei would conjugate just as if a fertilizing sperm-nucleus' (male-principle) 'had penetrated. If

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The question is whether it is worth the trouble and expense of cultivation, and whether far-reaching and unexpected results of a grave character may not be the penalty for trying to forestall Nature.

It is the merest truism to state that Nature has not intended men to be equal, intellectually, physically, or morally. What we call good and evil, morality and immorality, physical and mental strength and weakness, are factors of variability on which evolution depends. They are merely outward manifestations of variability in bodily tissue. If all men were "good," there could be no evolution, in the only sense which experience and reason tell us to apply to the term. Nature's procedure would need entire reversal before what we call "evil" could be extirpated from humanity.

That Nature wants men unequal is demonstrated to

this were so, the direct proof that egg-nucleus' (female) 'and sperm-nucleus' (male) 'are identical would be furnished.' Boveri succeeded in accomplishing this a few years later, although he made use of the nuclei of two spermatozoa" (male) "instead of those of the ova" (female). (Weismann.)

Another earlier contention is now thus modified by Weismann:—"We can safely affirm that in parthenogenesis individual variation exists, which, as in bisexual reproduction, has its foundation in the composition of the germ-plasm itself, and thus depends on heredity, and is itself inheritable. I thus erred in former times, in believing that purely parthenogenetic species entirely lacked the capability of transformation by means of selection; they do possess this power to a certain extent. I was, however, right upon the main point: for their capability of transformation must be much smaller than in bisexual species, as is evident from the observations described above as well as from theoretical considerations. The latter indicate that, in the course of generations, the constitution of the germ-plasm must ever become simpler; while the observations confirm this suggestion, inasmuch as they prove that a remarkable similarity exists between the descendants throughout numerous generations." (Weismann.)

The main fact that concerns the public is that the demolition of the Lamarckian doctrine is now complete. Nothing outside the germ-cell can be transmitted hereditarily, and no extraneous influence during the life of the creature can hereditarily affect the germ-cell. An apparent contradiction to this is the well-known transmission, from parent to child, of a certain disease: syphilis. This is merely the effect of direct infection of the germ-cell through the ovary. It is not true hereditary transmission. (H. C. H.)

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common apprehension by the fact that no two human organisms are absolutely alike; every such organism differing very materially from every fellow-organism. As every brute differs from every other brute of the same species, so every man differs from every other man, in organs, members, bones, muscles. "The variability of every part of man's structure is very great, and many of these variations tend to approximate towards the structure of other animals. The courses of the arteries are eminently variable, so that for surgical purposes it has been necessary to determine the probable proportion of each variation. The muscles are so variable that in fifty cases the muscles of the foot were found to be not strictly alike in any two, and in some the deviations were considerable; while in thirty-six subjects, Mr. J. Wood observed no fewer than 558 muscular variations. The same author states that in a single male subject there were no fewer than seven muscular variations, all of which plainly represented muscles proper to various kinds of apes. The muscles of the hands and arms—parts which are so eminently characteristic of man—are extremely liable to vary, so as to resemble the corresponding muscles of the lower animals." (Wallace.)

Science shows that such variability is universal throughout the types of organism. In many instances, it indicates reversion to an anterior stage of evolution. "It is quite incredible that a man should, through mere accident, abnormally resemble certain apes in no less than seven of his muscles if there had been no genetic connection between them. On the other hand, if man is descended from some ape-like creature, no valid reason can be assigned why certain muscles should not suddenly reappear after an interval of many thousand generations, in the same manner as, with horses, asses, and mules, dark-coloured stripes suddenly reappear on the legs and shoulders, after an interval of hundreds, or more probably of thousands of generations." (Darwin, "Descent of Man.")

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Society is directly opposing Nature, inasmuch as it is trying to render men equal. No doubt, in the end, Nature will convince society that "the game is not worth the candle." Already, ominous rumblings presage a quake which may rend civilization. It seems as though the fires under the artificiality of mankind were being fanned preparatory to a new social upheaval. Neither nations nor individuals make their own destinies. Both struggle blindly, achieving what they did not foresee, and often reaping disaster from imagined triumph. A term used in mechanics —unstable equilibrium, will express the present condition of society. This "unstable equilibrium" implies that the balance of forces is so nicely adjusted that the least further interference will precipitate a catastrophe inducing radically new conditions. The reason why society is now in this state of "unstable equilibrium" is that men have yet to realize that they cannot be educated equal. At present they are acting on the assumption that equal education is only needed to render Handicraft the equal of Intellect. Handicraft is trying to oust Intellect from the position hitherto assigned to it by the artifice of society. About that position, Nature does not care one jot. It is nothing to her that men estimate the value of a judge at £4000 per annum, and of a navvy at as many sixpences. But Nature will have men navvies as well as judges. If the navvies render themselves the social equals of the judges, they will change the "unstable equilibrium" into a catastrophe; a new social fabric will be evolved. How long it will exist will be until circumstances convince society that Nature continues to evolve men unequal—intellectually, physically, and morally. This conviction will be forced down the throat of society, in rapidly increasing doses, from the first moment of the new experiment. From that moment society will require judges and navvies, as heretofore. If it pays the same price for the former as for the latter, circumstances will soon impress on society that judges at the price of

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navvies are a bad bargain. From that moment, society will begin to reconcile itself to the fact that Nature will have men unequal. It is now too late to tell enthusiasts "with a mission" that they had better look before they leap. They are already well over the brink, and apparently will drag society after them. The mischief is that society will bump more heavily than they!

We must acknowledge that all our philanthropy can have no particle of influence on the type. All it affects is the individual. His potentialities it may help to develop; but it can neither increase nor diminish them. For each individual, at birth, all the social influences must start afresh their work. The young creature must learn them; he won't inherit them. Whether his father be a judge or a navvy will, apart from surroundings, have no particle of effect on the future man. The perfection of social arrangement would be that which afforded the greatest possible scope for individual potentiality to benefit society, while not opposing Nature in her determination to have men unequal. The higher mathematics, taught in Board-schools, may enable us, now and again, to turn the son of a navvy into a wrangler. In the meantime, we have probably spoiled a few score potentially effective navvies. We can dispense with all the graduates in England better than with half the navvies. If the exigencies of society would permit men to act on the assumption that a navvy is intrinsically as valuable a commodity as a judge, there would be no danger in giving the education of a graduate to the son of a navvy. As, however, though navvies are as essential to its well-being as are judges, society is compelled to treat one of the latter as worth, say, two score of the former, society cannot afford to turn navvies' sons into graduates. Some may think this a cruel dispensation for the navvy. It is no such thing. To the individual, the best that life affords is happiness. There is no reason why the navvy should not have as much of it as the judge. The probability is that he will have more of it

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than the graduate. By turning a navvy's son into a graduate, we rob him of some chances of happiness. It would be an instructive comment on the vanity of human aspiration if one could dissect the minds of, say, five hundred graduates, and the same number of navvies taken haphazard from their respective spheres. Then we should be able to fairly estimate who gets the better bargain by his dispensation—the graduate or the navvy. There is much virtue in the old adage that silk purses cannot be made of sows' ears. How many graduates have discovered, too late, that they are "sows' ears"? For how many is life an ignoble struggle in well-polished broadcloth? Truly, education, like most other good things, may be loved to excess. As a servant, it is the best friend to humanity. As an idol, it may topple over and crush a nation! Let us educate every child in the land; but, let us so educate as not to oppose Nature's decree that men are unequal intellectually, physically and morally. Moreover, let us realize that society's artifice cannot affect the fundamentals at the root of each individual's existence. A man may develop his potentialities as effectually in the calling of a navvy as in that of a judge, and outside man's little social sphere, the one calling is as well remunerated as the other. Nature's wage to the navvy equals that to the judge, to the duke, to the monarch! What applies to judges and navvies, applies throughout the whole range of avocation. Though the one is intrinsically no more valuable than the other, society cannot avoid remunerating on a higher scale brain than muscle. If education tends to destroy the due balance between the brain and the muscle-power of a community, that education is sapping the social foundation.

We judge mankind by the standards: "good" and "evil," and we hold men personally answerable for possessing the latter attribute. Now, what is "evil," as applied to man's moral nature?

Dr. Matheson, recently referring to the words: "Them

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that had gotten the victory over the beast and over his mark and over the number of his name," in a text from Revelations, asked, What really was the number of the beast? He observed: "Many commentators have written page after page to elucidate this matter. I have hardly read one of them, but I will tell you the number of the beast. The name of the beast is Selfishness, and his number is Number One"! It may be conceded that selfishness is tantamount to what we call moral evil. Let us see how far man is responsible for his selfishness, and how able he is to get rid of it.

We know that the law of Nature is change. Nature (by which, as already stated, we mean the method of Creative Energy) is continually groping to evolve fresh types. Selfishness is the greatest factor in superficially changing humanity; therefore, we may reasonably consider it important in Nature's scheme. If men were absolutely unselfish, otherwise ideally "good," it is evident that social evolution could not progress on its present lines: the order of things would be practically reversed.

The aim of most religious and socialistic schemes is to eliminate selfishness, otherwise, to fight against natural law. But, Science tells us, that inasmuch as man's devices can only touch the crust of humanity, and the kernel must be reached before Nature's enactment can be affected, such a struggle must be futile. For man to be habitually "good," Nature must repeal her own edict. She is in no hurry and abhors short cuts. She frittered away unnumbered ages in giving a stomach and mortality to a bit of potentially immortal protoplasm, and we have every reason to suppose she has similarly procrastinated in all her later exploits. Now, ponder this stupendously significant fact: Nature, with all her inconceivable versatility displayed through inconceivable time, has been constant once, *and once only*. She has never dispensed with the instinct of self-preservation, otherwise selfishness. This, age after

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age, she has placed in the germ-cell of every organized type; *this, she must take away from the human cell* before man becomes innately unselfish, otherwise, ideally "good."

We hear of numerous cases in which Nature is supposed to have so departed from her great precedent. We are told of absolutely unselfish men. For the moment, let us assume the existence of such. Can we infer from this that Nature is really busy evolving the first innately unselfish type; or, are these "good" men merely sporadic deviations destined to initiate no new preponderating variation? Unless, within measurable time, mankind have shown an appreciable advance towards altruism, we are bound to the latter conclusion. We should remember, in forming our estimate, the tremendous weight of precedent against the change, and we should allow for the sources of error arising from a complex civilization. We see civilized man under a veil of artificiality, his elemental character in the aggregate rarely even momentarily displayed. However, the question of life or death sometimes lifts the veil. When an angry, panic-stricken mob trample one another to death, civilized man displays his basilar character and, it must be confessed, leaves no reason for attributing greater elemental brutishness to the primitive than to the refined stock.

So far, we have assumed the existence of ideal "good," otherwise pure unselfishness. The question now arises: are we justified in doing so? Are we not assuming too much? Is not selfishness, after all, the sole, absolute, predestined incentive of humanity? Is not every "saint" an example of selfishness? Let us think. He is "good." Why? Because a divine message impels him. Does this message promise him a reward? It does. And he hopes to win it? He does. Now ponder; it is a big issue. We will assume, for argument's sake, that another message convinces this "saint" that "good" is the way to *eternal* pain; "evil" to *eternal* bliss. *Remember, he has no scintilla of doubt.* Will he hold to "good"? No! Or human nature

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is not his. His "goodness" is refined selfishness, nothing more. "Good" is ace of trumps—all hail "good"! It is a common deuce—away with it!

Analyzing in this way all the different forms of "goodness"—the pietist's, the philanthropist's, the moralist's—we find that the ultimate object of each is to serve Self: the identical person whom the burglar, the forger, and the murderer are so anxious to conciliate!

Science, moreover, tells us that it solely depends on a man's mental idiosyncrasy and circumstances whether he is to energize in one of the former or latter capacities—whether his life-drama is to be acted on the right or wrong side of the moral equator.

But, how perplexing is the fact that almost every country and age has its own specially constructed moral equator! England has a different one from that of France; one part of the United States from that of another; what is "bad" to-day in England was "good" a century ago. We may safely assert that a moral equator for the world will be an accomplished fact at the Greek Kalends, not before. Why? Because "good" and "evil" are merely unstable conceptions born of the ever-varying physical peculiarities and circumstances of humanity: they are the idealized expediency and inexpediency of their time and country.

Nevertheless, if there is no universal moral equator, there is an effective substitute: one rough test which suffices to decide the point for the world. This test is the voice of the "haves." The "man in possession" is the despot whose verdict is final. From the moment he first asserted himself he has "ruled the roast," and rule it he will as long as the present dispensation lasts.

Long before councils fulminated, long even before a decalogue became a factor in man's affairs, communities had their fashionable "good" and "evil." Such "good," broadly defined, was the interest of the "haves"; such "evil," the unholy desire of the "have-nots." From that

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initial impulse along the path of selfishness man has never once swerved. Regenerators have come and gone; philosophy has reasoned; emotion has appealed; man remains what he always was: an innately selfish animal.

Should not the "good" man, as he contemplates his sane, far-sighted, warranted-to-wear selfishness, pity, rather than anathematize the weak-minded villain with his wishy-washy imitation? Think, oh "good" man, with what "fitness" Nature has endowed you! Ponder your acumen and the obtuseness of the "villain!" He, petty jobber, grasps at a puny present—you, at a beatified eternity!

We are prudent in conforming to this "good." Experience proves that merely shamming it tends materially to our worldly welfare; emotion tells us that the genuine article will do us a splendid service hereafter. Nevertheless, it is nothing but specialized selfishness. The "good" man is selfish as the "bad"; the root-motive of both is the same. Then why is one exalted, the other crushed? Because Nature, apparently, is inconsistent. She has decided that what may be called elaborated selfishness shall prevail, yet continues to evolve creatures adapted only to primitive. When any of these are powerless to conceal their "unfitness"—when they cannot sham adaptability—the "fit" majority hound them down: Nature's inconsistency is visited on the creature.

Such an "unfit" creature is Fenton (the character previously referred to in the writer's drama). In contemplating this individuality, we cannot grasp its true significance unless we look at it from the biologist's standpoint. Merely to measure by conventional moral standards will lead us away from sound conclusions, because such standards are based on the false assumption that mental is less real than physical innateness. From the eminence to which science has now climbed we can detect—as we shall clearly show—this fallacy. We now understand that the obnoxious qualities displayed by a "villain" are

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as much the necessary consequence of peculiar organism as are the opposite characteristics of a Manning or Spurgeon, or, as is consumption, of the phthisical diathesis. We may mask, but we cannot destroy the "unfit" predisposition. Medical science may palliate the potential phthisis; beneficent environment may similarly affect the potential moral "evil"; yet, the potentiality, in either case, is only scotched, not killed.

Science, which has only truth for her goal, is more chary of condemnation than the professed Christian; more niggardly in commendation than the pronounced cynic. She is neither hero-worshipper nor executioner. She sees man the creature of his conformation: by his own volition merely able to hide or display what is fixed in him by a higher volition than his: the decree of that Power behind the universe. What Science sees to-day, mankind see to-morrow.

CHAPTER II.

If this position is established—and no unprejudiced inquirer who, by the aid of recent scientific research has fearlessly sought truth, can longer doubt such establishment—the doctrine that man is a free agent collapses. It must die like many other delusions which the emotional faculty has called into existence. Heart-burnings and tears notwithstanding, fallacy must perish. Noxious as she may at present appear to many noble minds, Truth must prevail. Some will hold to the end their precious legacy of delusion; some will profess to hold it when they have lost it; some will cast it away eagerly. Each will act consistently as the creature of his environment and conformation. Whether the death be gradual or sudden, nobody can now reasonably deny that the receptivity which admits, or the scepticism

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which rejects, the old doctrine, can only exist by virtue of a special physical organization. "Free-will" cannot induce us, in opposition to our intellect, to believe in "Free-will." Whether we accept or reject depends purely on ratiocination. We may acquiesce in what affronts our reason; we can only believe what satisfies it. Credulity which concurs in what it does not comprehend is outside the area which concerns creatures endowed with reflective capacity. Until lately such credulity induced men to accept as fact a particular theory they could not comprehend. Men cannot longer, as reasoning beings, make this glib concession to emotion. If we know the conditions under which steam acts on the engine, though we are ignorant as to the force behind those conditions, we are able to determine what is possible to the engine. Similarly, if the physical conditions under which the mind works have been ascertained, we have got so far towards the identification of the *ego* as to show what limits human freedom. We can now determine what is possible to mind, because we know the conditions under which force, otherwise nerve-current, acts on the brain. We know that consciousness, the assumed measure of responsibility, is merely a manifestation of cerebral nerve-action occurring *after* other nerve-actions have collectively affected the brain; that nerve-currents arouse to action certain fibres and cells in the brain, and that consciousness of this action is only possible to the individual *after the action has begun*. The individual thus responds to certain influences affecting special brain areas, much as the Eolian harp responds to the wind: in other words, he has begun to "will" *before he is conscious* of the fact.

If Dogma, in the face of recent research, is still anxious to continue the fight for "free-will," she must find some other weapon than metaphysics. This is now of no more utility for proving the doctrine than for proving a sword-blade. "Free-will" is lifted clean out of the region of

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philosophy. It is now in the region of fact, and must bear the test of fact. Science as flatly denies "free-will" as she maintains "gravitation." Metaphysics may as easily demolish the latter as preserve the former. At present, the mass of men have not realized this. Time will soon drive conviction home. Men believed the earth flat, long after it was proved round, mainly because their senses conspired to delude them, and their collective intellect was torpid. Now the case is different. Men's intellect is not torpid, and their senses don't tell men to believe in "free-will." One year, now, may be trusted to do the work of fifty of a century earlier in killing delusion. "Until the anatomy of the brain and nervous system was as closely studied as it has been within the past twenty years, all reasoning as to the processes of sensation and thought was necessarily as unsound as the methods of treating disease which obtained before the discovery of the circulation of the blood. The Lockes, the Dugald Stewarts, the Benthams, the Humes, and other distinguished writers of a bygone day, who discussed the operations of the mind, were somewhat in the position of a man who should presume to lecture upon the steam-engine without knowing anything of its internal arrangement of valves and pistons. Happily the inquirer into the mysteries of thought is no longer constrained to wade, as in the past, through a bottomless quagmire of speculation; he has now something like a solid footing to go upon, and the relations of mind and matter have become, like other branches of science, the subject of exact investigation." (Nisbet.)

Science accounts, not only for "willing," but for every thought and feeling, and every fragment of a thought and feeling, by the action of nerve-current on nerve-fibres and cells. Every fragment of thought or feeling has its special physical channel. Then the number of channels must be inconceivably great. Such is the case. Bain shows the number to be: (cells), 1000 millions; (fibres), 5000

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millions. This would provide, for 200,000 acquisitions (the power of the most richly endowed mind), 5000 cells and 25,000 fibres for each nervous grouping. "Such an estimate, confined to the hemispheres of the brain, is enough for its purpose, which is to show that, numerous as are the embodiments to be provided for, the nervous elements are on a corresponding scale, and that there is no improbability in supposing an independent nervous track for each separate acquisition." (Bain.)

Luys, in his work, "The Brain and its Functions," clearly shows how the various sensibilities arise.

Let us take, as an example, the sensibility to ethereal vibration, called sight. Ether vibrates on the retina. There, the vibration is converted into nervous energy. This is carried along the fibre to an isolated mass of nerves and cells in the centre of the brain, called the *optic thalamus*. Thence it progresses to the *sensorium*, or peripheral grey substance of the cerebrum. This transforms it again, and reflects it to another mass of nerves and cells adjacent to the *optic thalamus*, called the *corpus striatum*. Only after it has been ejected from the *sensorium* into its special nervous channel does it emerge as sight.

Every sensation, impulse, desire,—intellectual, moral, or animal,—as we shall presently demonstrate, has to pass through similar processes of assimilation and transmutation before the alchemy of co-ordinating parts of the brain has changed the original excitant into definite consciousness. And every such change requires time for its accomplishment. We do not see simultaneously with the impingement of ethereal vibration on the eye. Here is a perfect description of the phenomenon of sight given in a work by Mathias Duval. "When the retina is excited, perception is not immediate; it is retarded for a very short period. This retardation is due to the fact that it requires a certain time for the transformation of the luminous into nervous movement to take place. Then this latter movement

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requires an interval, exceedingly short indeed, to be propagated along the optic nerve to the cerebral centres; and finally, the centres themselves are not immediately thrown into agitation. This retardation occupies one-fiftieth to one-thirtieth of a second."

Science has not merely ascertained the rate of progress of a sensorial impression, such as sight; she has measured the rapidity of thought itself. Helmholtz, Donders, Hirsch, and Marey have experimentally achieved this apparent impossibility. "From these experiments it results that the velocity of impressions varies according to the individuals, and even for the same individual, according to the temperature; at a low temperature the velocity of the nervous agent is less. Impressions travel from the periphery to the nerve-centres, and volitions from the nerve-centres to the periphery, with an average velocity of thirty metres per second. Between visual, auditory, and tactile impressions, and the reaction of the hand, showing that the impression has been perceived, there elapses one-fifth of a second in the case of visual impressions" (this must not be confounded with a mere sight impression, such as described by Duval. In the latter, the sensorial impression alone, without thought, was considered); "one-sixth in case of auditory impressions; and one-seventh in case of tactile impressions. But, as Donders remarked, this case is itself complex, and is resolvable into two psychical stages: (1) impression travelling from periphery to centre (sight); (2) volition travelling from the centre to the hand (thought). By some curious experiments, he thinks he can prove that the simplest act of thought, the solution of a very easy dilemma, requires one-fifteenth of a second. Wundt, from experiments of his own, finds that the most rapid act of thought requires one-tenth of a second. The velocity of thought, and consequently the number of states of consciousness, vary considerably. In some dreams, and in the mental state produced by opium

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and hasheesh, this velocity is such that phenomena of consciousness, which can have lasted only a few seconds, appear, by an illusion that is easily explained, to have lasted several minutes or several hours. The well-known opium eater, De Quincey, had dreams which appeared to last ten, twenty, fifty, or seventy years, or even transcended the limits of all possible experience. The reason of this is, that we measure the length of time by the number of our states of consciousness. Retrospectively, a space of time during which we have been active seems much longer than one in which we have been idle." (Ribot.)

Consciousness of several impressions cannot apprehend the sensations simultaneously. We cannot see the wall and floor of a room simultaneously. We think we do, but that is illusion. If we could perceive, microscopically enlarged, the vibrations of consciousness, we should find separate conscious impressions from all the points of surface, which we think we perceive simultaneously as a whole. Multitudes of such vibrations of consciousness cause us to manifest in action and thought the moral, intellectual, and sensorial powers of the sum-total of cerebral sensibilities, or what we call mind.

Reflection, idealism—all the higher intellectual efforts—are thus absolutely dependent, as are the mere animal sensibilities such as hunger and thirst, on the co-operation of organic parts. The higher intellect is the superposition, from age to age, of increasing degrees of nervous complexity on the existent nerve-and-cell connections and ramifications of the organic type. This increased complexity arises from spontaneous modification of the germ-cell. It is fixed by the tendency of Nature to evolve what is "fittest" in greatest profusion, and its efficiency is exercised by the ever-increasing accumulations of transmitted knowledge. From the first glimmer of intelligence in primal man, might, if similar facilities were available, be traced as clear a concatenation of cause and effect, acting

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age after age, in the intellectual development of man, as we find to have so acted in the evolution of the earth's crust. The Immateriality concerned is the same for one as for the other. The supposed special immateriality of the one is the conception of ignorance. We will now establish these propositions by some recent verifications of scientific psychology. The authorities we may quote are pre-eminent in their special branches of research, and, as far as possible, we shall use their own words in stating the main facts on which we base our conclusions.

CHAPTER III.

The brain, which generates thought, can only do so through the co-operation of the peripheral sensibilities: sight, hearing, touch, taste, and smell. Were a human being to be born without these latter, such being would live absolutely destitute of ideas, though his brain were normally constituted. Congenitally deaf and blind people, though their brains be as potentially effective as a Newton's, rarely equal brutes in intelligence. Were the other outer sensibilities to be likewise non-existent, such brains could manifest no greater perception than the piston-rod of a locomotive.

Our body is furnished, at every point, with infinitely minute cells and fibres which conduct vibration from the outer world to the brain. Myriads of these conductors are ever alert to receive impressions and despatch them, metamorphosed into nervous movement, to the sensorium which again transforms them into animalized sensations, sooner or later, to be returned to the outer world in the shape of acts, or written and spoken thoughts. As food is transmuted into flesh, bone, and blood, by the alchemy of the visceral juices, so is this outer excitation assimilated and transmuted by nervous sensibility into conscious personality. Thus, our nineteenth century intellectualism originates from, and

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absolutely depends for its continuance on, purely sensual excitation. Take this away from the next generation, and assuming the possibility of existence under the circumstances, humanity would at once revert to rudimentary automatism. All the results of mental effort achieved since man existed would be annihilated. All religion, all history, all art, all science would be as though they had never existed. Brutes would be higher in the scale of creation than humanity. Ponder the bearing of these truisms on the doctrine of "Free-will."

Of course it is impossible to demonstrate, by actual instance, the fact of this absolute dependence on external stimuli, of all mental action, because no individual has ever existed under the hypothetical condition of being entirely devoid of peripheral sensibility. However, the following case reported by Dr. Strümpell (Pfluger's "Archiv." translated in *Nature*, December 13th, 1877) is so near actual demonstration, and so instructive, as to be worth quoting in full. "In the autumn of last year there was received into the medical clinic of Leipzig, a youth, aged sixteen, in whom various phenomena of anæsthesia gradually developed themselves to an extent which has very rarely been observed. The skin of the whole surface of the body was completely insensible, and that in respect to every kind of sensation. The most powerful electric current, or a burning taper held to the skin, was not able to produce any pain, or even a sensation of touch. Almost all the accessible parts of the mucous membrane of the body exhibited the same insensibility to pain. Also, all those sensations which are classed together under the name of 'muscular sense' were entirely absent. The patient, when his eyes were closed, could be carried round the room, his limbs could be placed in the most inconvenient positions, without his being in any way conscious of it. Even the feeling of muscular exhaustion was lost. In addition there came on a complete loss of taste and smell, amaurosis of the left eye, and deafness of

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the right ear. In short, here was an individual whose only connection with the outer world was limited to two doors of sense: to his one (right) eye, and his one (left) ear. Moreover, both these remaining doors could at any time be easily closed, and in this way it was possible to investigate the consequences of completely isolating the brain from all external stimulation through the senses. I have made the following experiment, and often showed it to others: If the patient's seeing eye was bandaged and his hearing ear was stopped, after a few (usually from two to three) minutes, the expression of surprise and the uneasy movements which at first showed themselves, ceased, the respiration became quiet and regular; in fact, the patient was *sound asleep*. Here, therefore, the possibility of artificially inducing sleep, at any time, in a person, simply by withholding from the brain all stimulation by means of the senses was realized. The awakening of the patient was as interesting as the sending him to sleep. He could be awakened by an auditory stimulation, as for example, by calling into his hearing ear, or by visual stimulation, by allowing the stimulus of light to fall upon his seeing eye; but he could not be awakened by any pushing or shaking."

In our opinion, one such case as this is enough, almost of itself, to demolish all the learned nonsense which has been written about the "mind." It shows that, for ages, doctors of ponderous intellect have been wasting their faculties by trying to apply anatomy to a shadow; that the tons upon tons of literature on the subject of the human "ego" might as well have remained pulp, and the arguments in them have gone to dust with their authors' learned heads, for all the good mankind have got out of them. There can be no value, as illuminants, in masterpieces of logomachy, if all they do is to argue from fallacy to fallacy. We can tolerate fiction in art; speculation should, at least, start from a basis of objective verification, however strongly it may ultimately exemplify romance. If these metaphysicians had

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but started work with an ounce of Fact—a grain—a molecule—an atom!! Alas, they didn't! But they tried to build castles starting from the summit!

We will now show that this brain is a machine, in the full sense of the term: it does its work in a strictly mechanical fashion. We shall show that motions of its invisible parts are examples of dynamic energy, just as is the hammer wielded by the blacksmith's arm. To accomplish our purpose, we will first direct the reader's attention to a few facts behind that familiar form of energy—Heat—and we will see how these facts apply to the machine we call brain.

We should naturally suppose, after superficial consideration, that rest was the normal condition of Matter. The reverse is the case. Matter is normally in motion. A body projected into a perfect void, and unaffected by other bodies, would continue to move indefinitely in a straight line. But there are no such bodies in the universe. Every body, equally with every atomic part of such body, is affected by other bodies and their atomic parts, and by an all-pervading medium. Consequently all Matter has more or less eccentric motion. Thus is accounted for all eccentricity of motion in the universal medium—from the orbits of celestial bodies to the collisions of molecules—by Newton's first law of motion, that "every body must persevere in its state of rest, or of uniform motion in a straight line, unless it be compelled to change that state by forces impressed upon it." Motion, like Matter, we can neither create nor annihilate, but we may change it into other forms of force or energy, such as heat and electricity, from which, again, we may produce motion. Every force, directly or indirectly, may be changed into every other force. Meyer, Joule, Grove, Helmholtz, have clearly enunciated the doctrine of force-transmutation, which, it is needful to remark, does not stop at physical force. "Various classes of facts thus unite to prove that the law of metamorphosis, which holds among physical

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forces, holds equally between them and the mental forces. Those modes of the Unknowable, which we call motion, heat, light, chemical affinity, &c., are alike transformable into each other, and into those modes of the Unknowable which we distinguish as sensation, emotion, thought: those, in their turns, being directly or indirectly re-transformable into the original shapes. That no idea of feeling arises, save as a result of some physical force expended in producing it, is fast becoming a common-place of science; and whoever duly weighs the evidence will see that nothing but an overwhelming bias in favour of a preconceived theory can explain its non-acceptance. How this metamorphosis takes place—how a force existing as motion, heat, or light, can become a mode of consciousness; how it is possible for aerial vibrations to generate the sensation we call sound, or for the forces liberated by chemical changes in the brain to give rise to emotion—these are mysteries which it is impossible to fathom. But they are not profounder mysteries than the transformations of the physical forces into each other. They are not more completely beyond our comprehension than the natures of Mind and Matter. They have simply the same insolubility as all other ultimate questions. We can learn nothing more than that here is one of the uniformities in the order of phenomena." (Spencer.) Mr. Spencer shows that the general law of transformation and equivalence is universally active, affecting physical, vital, mental and social forces.

Let us now consider a little more closely one of the forces—heat. Heat is the resultant of obstructed motion. The friction of the air and moving bodies generates it, just as does the collision between two such bodies. A hammer falling on an anvil; a feather floating in the atmosphere; a molecule colliding with another molecule, generate heat, which is consequently called an equivalent of mechanical energy. By wonderfully exact experiments, the late Dr. Joule determined the equivalent of heat to work. Science

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has accepted his conclusions which, in scientific treatises, are now denoted by J, the initial of his name. Joule ascertained that one heat unit is equal to 424 units of work: for instance, if a kilogramme of water (weighed *in vacuo* at about 10° C.) be dropped through 424 metres, then suddenly stopped, the heat generated will raise the temperature of the water one degree Centigrade. This applies universally to all mechanical energy and heat.

By the molecular motions and collisions of his parts, the sun accumulates heat. As these parts become gradually more compressed they lose so much energy of motion, and generate proportionately less heat. Through these causes and the radiation into space of his heat, the sun gets slowly denser and cooler. Science infers that the time will come when he will be as cold and dense as the moon. Then the earth will cease to support life as at present constituted. Of course, this will happen long before the sun becomes as cold as the moon.

Molecular movement is inherent in matter, consequently there is heat in everything: in a stone as in burning coal. Cold is only a relative term. For instance, the freezing point or temperature at which liquid, under ordinary atmospheric pressure, becomes solid, is: of water, 32 degrees Fah.; of platinum, 3650 degrees. Again, with a mixture of bisulphide of carbon and liquid nitrous acid, we can obtain a temperature of 252 degrees below the freezing point of water. By means of liquid sulphurous acid, water has been frozen in a white-hot crucible; but pure spirit has never been congealed. The absolute zero of temperature, or atomic stagnation, has been fixed at 492 degrees below the freezing point of water.

The molecular energy, which is equivalent to cerebral activity, generates heat, just as does the hammer striking the anvil, or do the sun's parts tumbling together. Cerebral heat is generated according to the strength of the nervous shock, being disengaged by such shock quite

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independently of the normal temperature of those cerebral areas unaffected by the shock. Lombard, by means of very exact thermo-electric apparatus, has verified this. He says: "In the condition of cerebral repose, during wakefulness, the temperature of the head varies very rapidly. The variations are very slight, not attaining the one-hundredth of a degree Centigrade, but they are none the less worthy of attention, for this reason: they are confined to the head. The variations of temperature appear to be connected with different degrees of cerebral activity. During active brain-work it never exceeds the twentieth of a degree Centigrade. Every cause that attracts the attention, a noise, or the sight of an object or person, produces elevation of temperature. An elevation of temperature also occurs under the influence of an emotion, or during an interesting reading aloud." (Lombard.)

Lombard experimented only on the skin of the skull. His experiments have been confirmed by Schiff, who has penetrated the cranium. Schiff "has therefore succeeded in defining not only what regions of the cerebral cortex are isolatedly called into play by such or such kinds of sensorial impressions, and demonstrating experimentally that there are isolated circumscribed spots reserved for such or such kinds of sensorial impressions, but also that the arrival of these impressions resolves itself into a local development of heat in the special area where it disseminates itself; and that the heat thus developed is a dynamic phenomenon independent of the circulatory activity, a true vital reaction of the sensorium." (Luys.)

By gradually eliminating the purely sensorial factors, Schiff proves the existence and arrives at an estimate of the heat disengaged by the psychical powers proper, apart from the mere sensorial impressions.

We have thus conclusive evidence that molecular movement in the stimulated brain is a real thing; that it is no phantom of the scientist's invention. We find a disturbance

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of parts by an external force resulting in a determinate quantity of heat which is the equivalent of the mechanical energy exerted by the cerebral machine under stimulation by this force; the molecular disturbance in the cerebral nerves and cells being as truly a dynamic action as in the hammer's collision with the anvil. This, even without further corroborative evidence, would lead us to the inference that all we call mind absolutely depends on molecular movements in the brain, and we should be thereby compelled to deny the possibility of any outside agent, such as "Free-will," affecting this circuit of molecular motions.

Molecules are, of course, far too small to be detected even through the most powerful microscope; nevertheless, Science is enabled to positively affirm their existence, and, in gaseous states, even to approximately measure them and state their probable number of collisions in a definite lapse of time. Here we have a theory which will probably never be verified by actual observation of a typical individual, yet which has the essentials of axiomatic truth. To know how Science has attained this verification, the reader must consult a treatise on the subject which is only referred to here as bearing on the "Free-will" assumption. Clerk-Maxwell, Clausius, Boltzmann and others have made great advances in this class of research. It is deduced that each molecular particle of oxygen has 7600 million collisions with others, per second. The following approximate figures are taken from Clerk-Maxwell's (1873) Bradford lecture on Molecules :—

	Hydrogen.	Oxygen.	Carbonic Oxide.	Carbonic Acid.
Velocity of mean square at 0 degrees Cen. ...	6190	1550	1656	1320
Mean path	386	224	193	151
Collisions	17750	7646	9489	9720
Diameter	2·3	3	3·5	3·7

The collisions are here given in millions per second; the

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mean path and the diameter in hundred millionths of an inch; and the speed in feet per second.

We may assume that, through excitation, the nervous molecules become agitated, as inorganic molecules are agitated by heat or electricity. Further, we have good reason to suppose that the minute nerve-fibres and fibrils act analogously to the insulated wires which convey the electric current. "The white substance, essentially composed of nerve-tubules in juxtaposition, occupies the spaces comprised between the cortical periphery and the central ganglions. The fibres of which it consists, and which merely represent lines of union between such and such regions of the cortical periphery and such and such regions of the central ganglions, run like a series of electric wires stretched between two stations. . . The nerve-fibres which represent the bonds of union between the cortical substance and the central regions of the brain emerge from the midst of the plexus of cells. They all at first appear as isolated filaments . . . then by degrees, as they proceed between the ranges of cells, they enlarge, their sheath thickens . . . The cortical substance represents an immense instrument constituted of nervous elements, each gifted, it is true, with its proper individuality, and yet intimately connected with one another. The series of cells in stratified zones, and the connections of the different strata communicating one with another, imply the idea that the nervous activities of each zone may be isolatedly evoked; that they may be associated one with another; that they may be modified in passing from one region to another, according to the nature of the intermediary cells brought into play; that, in a word, nervous actions, like vibratory undulations, must propagate themselves through one point of contact after another, following the direction of the organic substance that underlies them . . . Thus it is that each region of the cortical periphery is united, by means of these white fibres, to a symmetrical region in this common

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ganglion of grev matter (the optic thalamus), and that these two foci of nervous activity, the cortical periphery and the central ganglion, like two electric piles united by a common wire, are intimately united into a single instrument." (Luys.)

Thus, we find that the brain is a machine capable of transforming one into various sorts of energy, and, while doing so, evolving a certain quantity of heat. As the locomotive transforms heat into tractive energy, so the brain transforms some undetected force into thought, action, sensation. This undetected force is probably some form of ethereal vibration akin to what we call light or electricity. However, it should be remembered that our nomenclature of all forms of fundamental energy is entirely arbitrary. The tendency of Science is towards a unification of all such forms of energy as being merely special manifestations of one original.

We will now consider the different functions of this highly complex cerebral machine, and we will apply facts respecting these functions to enlarging the horizon of our conception respecting the sociological and ethical propositions on which men have for ages based their notions of good and evil, virtue and vice, personal responsibility. We will try to get to the very root of the so-called moral perception. We will show how this energizes and to what extent man is able to direct its energy.

All cerebral action has for its foundation, mere sensual perception, or animal sensibility.

SENSIBILITY begins with life. From the fourth month, in fœtal life, this sensibility is clearly traced, reaching its highest manifestation in youth, then gradually declining, until, at senility, it recedes to its early character.

"At birth, it is the entire cutaneous sensibility, suddenly awakened by the irruption of the young being into a cold atmosphere, which determines its first startled cries, and its first inspirations." (Luys.)

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Automatically, through hereditary tendencies, it takes the breast. Its sensual appetite is gratified. By an inherent power of the nerve-cells, referred to later, memory is evoked. The infant recognizes its nurse, and, in its own way, expresses satisfaction at her presence. "Here, in these first phases of the manifestations of human sensibility, is the rudimentary formula according to which the moral sensibility of the human being shall henceforth be evolved in the course of his life . . . that is to say, reducible to a purely sensitive phenomenon multiplied by the intervention of memory and intelligence." (Luys.)

PAIN is a purely vital action inherent in every living cell, vegetable and animal. Just as certain molecular excitations cause iron to develop heat and light, so others cause living cells to develop pain or pleasure. Suffering is not a matter of the "will"; it entirely depends on the vitality of nerve-cells in sympathy with the special excitant. Hysterical people, among whom may be classed fanatics of all sorts, are often incapacitated from normally feeling pain. Their peripheral plexuses are, as it were, paralyzed, and are thus incapable of conveying stimuli to the central regions where consciousness is generated. Pinch, prick, or burn the skin of such people during an attack, they feel nothing except the mere contact of the excitant; pain, they do not experience. Local anæsthesia on healthy people produces the same effect. Again, it is produced in the central cerebral regions by the inhalation of chloroform. Then the effect is distributed generally throughout the organism. When all men are normally sensitive to pain, though voluntary martyrs may be extinct, a higher standard of mutual consideration will prevail: mankind will be nearer the Christian ideal!

The sensations of light, sound, touch, taste, smell, do not exist in the respective organs, which merely suffer specific irritations by the stimuli to which they are sensible.

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The individual is unconscious of these irritations until they have been transmitted by their special nervous channels to the sensorium. The nerve-fibres which convey to the sensorium the irritations which we call sight, hearing, touch, taste, smell, although they are closely packed together, never confound the respective stimuli: analogously to the insulated wire, each transmits its special current. If we destroy the particular fibres, the sensations cease, though the organs may remain apparently sound. The amaurotic eye, thus separated from the sensorium, only betrays its condition through the invariably dilated pupil; otherwise it appears bright and sound. Thus, the peripheral sensibilities are as inert without the co-operation of the central ganglions, as are the latter, unsupported by the peripheral sensibilities.

The peripheral sensitiveness to outside stimuli which gives us the pain from too glaring a light, has its counterpart in other forms of sensibility which give us moral pain. This depends on sensorial sensibility and memorizing power in conjunction with intelligence. These will be later referred to. One moral equivalent of the too glaring light is the stimulus of opposition to our animalized conception of "right." This, as will be shown later, is no more reliable as a true impression of absolute right, if such a thing exists, than is our visual impression, of absolute light. This animalized conception of "right" is our hereditary condition in respect to specific nerve irritations. Just as too glaring a light offends the visual and "intelligence" areas of the brain, so "wrong" offends the "reminiscence" and "intelligence" areas, to which latter we shall presently refer. The conceptions of "right" and "wrong" have been evolved, through ages of experiment, from purely animal desire. They are the idealized desire, or expediency (and its opposite), of the majority of mankind. The lower animalized conception of "right" which prompts the tiger to kill the deer, or to go higher in this comparatively low scale, the conception

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which prompts the dog to protect his master, is not different in essence, only in degree, from man's highest conception of "right." It is as "right" for the tiger to kill the deer as, among us, it is "wrong" for the man to kill his fellow-man; but, if all tigers had agreed that death must be the penalty for killing a deer, then among tigers it would be as "wrong" to kill a deer as among, say, the savages of Tierra del Fuego it is "right" for one man to kill another. We have proceeded much further towards the discovery of absolute light than towards that of absolute right. Science has cudgelled her brains about the former; only Dogma has experimented on the latter. Nevertheless, we shall probably, while earth holds humanity, not know the absolute of either. Our notions of both—of "right" far more so than of light—are conventionalities more or less distant from reality; and we shall ascertain no absolute truth respecting either, by looking at it subjectively. This subjective contemplation of "right" has not been practised to ascertain truth but to establish a theory of personal responsibility, on which to erect another superstructure—sacerdotalism. As long as men candidly own that their "right" means nothing but collective expediency, they display discretion compatible with the present scientific methods of inquiry, and are justified in following their conclusion to its logical issue: maintenance at all hazards of the expediency, by the exaction of penalties for its breach. When, however, men treat this "right" as a demonstrated reality and presume to hold the terrors of a Deity's retaliation over its transgressors, they only manifest the crass ignorance which would confound the reality of ethereal vibration with the mere sensation of sight.

The subjoined remarks of Professor Ribot, although intended by him to bear a different construction, are quite conformable with the assumption that "right" is the equivalent of collective expediency:—"This leads us to estimate at its true value a doctrine still largely diffused, which regards morality as simply conventional. The philo-

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sophers of the eighteenth century were disinclined to see in it anything more than an artificial production, based on a primitive contract. Before their time, Pascal had advanced this theory in a famous passage, where he himself did but express a thought previously uttered by Montaigne: 'They do but trifle when, in order to give certitude to laws, they say that some of them are stable, perpetual, and immovable, which they call natural laws.' This scepticism has been opposed only by denunciation and denial, based on vague proofs. Perhaps if its opponents had accepted the evolution of moral ideas they would have found a better answer, because that analysis, penetrating to the very basis of morality, shows its nature and its stability. We might say that morality is natural, as is proved by the fact that it is an absolute condition of man's existence, and might establish our position thus: Man, considered as an intelligent being, can only live in a society; this is proved by the most positive facts. In a state of isolation man is without a mind. On the other hand, society, even in its simplest form, can only exist on certain definite conditions. Suppose a society whose members hold it to be right, or else simply indifferent, to murder and pillage one another; where parents abandon their children and children maltreat their parents, it is quite clear that such a society cannot subsist; it will perish by a vice inherent in its very constitution. As well might we say that an acephalous or hydrocephalous monster can live and breed, which would be a physiological absurdity. It is inevitable that every monster and every organism outside of the normal conditions of existence shall perish; and this is true also of the body social. But morality reduced to its essentials, that is, to those laws which excite Montaigne's merriment, consists in those essential conditions without which man disappears. Thus, to sum up, without morality no society, and without society no human race. Therefore we have here no convention, and we may say that it is immutable,

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necessary, imperative; not employing these terms in the vague transcendental and incomprehensible sense usually given to them, but in a precise, positive, and unambiguous sense; for they signify that morality is as stable as nature, and its necessity is that of logic." (Ribot.)

The gist of the above is that morality is an arrangement invented by man to enable him to live in community in conformity with the drift of evolution, which drift, again, has impelled man to invent the arrangement. In its fundamentals, this morality is simply the constant groove of sensibility implanted in humanity, which we call common-sense. To this extent it is natural, just as eating is natural. We only begin to import error into our reasoning when we try to make morality supernatural and invent supernatural penalties for its transgression. The morality which bases its pretensions on being a standard of conduct suited to the collective physical idiosyncrasy of a community is not a mere convention. The morality which pretends to be a supernatural revelation ratified and maintained by supernatural decrees and penalties is, most emphatically, a convention, pure and simple—and moreover a most preposterous one. Of course, there could be, no more, communities of men without standards of conduct preventing them from pillaging and murdering one another, than there could be communities of wolves without standards of conduct preventing them from killing and eating one another. Yet there is no more of the supernatural about the man's than about the wolf's standard of behaviour; both are merely the effects of evolution on the respective types, one of which has evolved a very elaborate, while the other retains a primitive standard of behaviour.

But while our morality, understood as expediency, is not conventional, our conceptions of "good" and "evil" must always remain conventional, unless we merely attach to them the signification of being the qualities which oppose or support our expediency. In this limited sense they are

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not conventional; but, then, this is not the sense in which Dogma tells mankind to realize them.

If this morality had the faintest claim to the character of a supernatural institution, how came it, among its ostensibly supernaturally appointed exponents, to strut about in this frowsy fashion? "Some of the popes led scandalous lives, and the clergy who did abstain from marriage, kept concubines, sometimes in large numbers. A Spanish abbot was discovered in the year 1130 to have seventy concubines, and a Bishop of Liège in 1274 was deposed for having sixty-five illegitimate children. Enactments had to be passed forbidding priests to live with their mothers and sisters, because of the prevalence of incest among them; nunneries and monasteries were hotbeds of debauchery; and congregations who had an unmarried priest to minister to them stipulated in some cases, with a view to the protection of their wives and daughters, that he should keep a concubine." (Lea's "History of Sacerdotal Celibacy," quoted by Nisbet.) "In a similar spirit it was decreed by a council that no priest should be allowed to go out at night without a candle." (Nisbet, "Marriage and Heredity.") One of the main causes of this state of affairs was that those supernaturally "inspired" Church fathers, to whose authority we are commanded by sacerdotalism to subject nineteenth-century reason, had ordained that marriage was a bestial institution meriting the strongest condemnation of Mother Church. Now, Mother Church designates it a solemn contract with Heaven, never to be cancelled on earth! To show the amazing changes which men's minds have undergone with respect to one of the most important "moral" expedients, we will cite a further extract from Mr. Nisbet's book. "For many centuries after Christ, marriage was regarded as a purely civil contract. It was bitterly assailed in that form by the fathers of the Church, and there was a particularly nauseous element in the reforming zeal of

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these holy men. Chastity was preached, not because it was a good thing in itself, but because man's fall and the necessity for his redemption were traced to an indiscretion in the Garden of Eden. The polluting influence of passion was not thought to be redeemed by marriage. All intercourse between the sexes was discountenanced. It was taught that to have children under any circumstances was a sin, as it only supplied food for death, and that woman was an instrument of Satan St. Jerome in the fourth century, while treating simple marriage as evil and vicious in itself, reserved the worst vials of his wrath for what was called digamy" (second marriage). "Decrees were made forbidding married women to approach the altar or to touch the Eucharist, and it was even declared to be doubtful whether married persons cohabiting with each other could be saved. St. Chrysostom, in the fifth century, boldly averred that if man had not sinned the world would have been peopled by other means. All married persons were exhorted to pray for grace to keep themselves undefiled, and wives were commended for declining the embraces of their husbands." (Nisbet.)

Now, we all know what views are prevalent to-day on the subjects of marriage and chastity. But assuming that this morality really is a supernaturally ordained institution, how are we to know who are the correct exponents of Heaven's decree—the Church fathers who condemned marriage, and the popes and bishops who practised libertinage as a substitute, or the "purists" of to-day? On the one hand we are told to accept the dicta of these "inspired" fathers with respect to what we must believe and not believe, and we are informed that these amorous popes and bishops were the supernaturally appointed expounders and exemplifiers of the doctrines of Christianity and its concomitant "morality"; on the other hand we have modern sticklers for chastity furiously opposing the lessons inculcated by these sanctified churchmen. Who

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are they to whom has been revealed this real supernatural "morality" of sexual intercourse? As this particular "morality" is one of the most important in the whole range of ethical so-called revelation, we think it a good test-case to be worked up by the advocates of the "supernatural" thesis. Let them show how it is that a supernatural "morality," as exemplified by supernaturally appointed guardians and exponents, becomes, at certain periods, what we should now stigmatize as a disgrace to humanity. To assert that not the morality, but the instruments of its interpretation, became degraded, is merely to assert that this supernatural "morality" is dependent on the fluctuating tendencies of the creatures it is assumed to dominate. Now, such a "morality" as this is tantamount to an invention of men: it is the merest waste of words to attribute to it any divine character apart from the ordinary products of men's brains. We shall later apply similar reasoning to another supposed human attribute which it has pleased ecclesiasticism to designate as supernatural, viz. "Free-will." We shall try to show that it involves a contradiction in terms to impute supernaturalness to what depends for active manifestation on organic tendency, and is consequently a natural phenomenon. More than this cannot be rationally maintained: that the collective physical idiosyncrasies and experiences of communities have, in each age, enabled men to fashion their own from precedent moralities, and that each individual will, according to his potentiality, conform to the "morality" assigned to him by his surroundings.

We are told by Professor Redford (or rather he expresses the idea in the course of a quotation from Luthardt), one of the ablest of the modern champions of dogma, that "this result of history proves that the two, religion and morality, are assigned to each other, that their truth is only found in their union." By "religion" is here meant, of course, only the religion of Professor Redford. This position

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Mr. Redford attempts to establish by, among other assumed proofs, the facts of ancient history. The writer denies that Greece of the Philosophic Age was one whit less "moral" than is the England of to-day. Anybody who desires an impartial statement of the facts should read "Paganism and Christianity," by J. A. Farrer. In that work the cobwebs, by which interested partizans have blinded mankind to the true state of the classical age, are brushed away. It is the merest proof of ignorance, or deliberate intention to mislead, to base any argument in support of the "moral" superiority of dogmatic teaching, on the assumed "moral" degeneracy of Athens, Sparta, or Rome. Compare such sayings as these:—"It is eminently humane and a clear sign of a truly generous nature, to bear the affronts of an enemy when you have a fair opportunity to revenge them. For if a man sympathizes with his enemy in his affliction, relieves him in his necessities, and is ready to assist his sons and family if they desire it, anyone that will not love this man for his compassion, and highly prize him for his charity, must have, as Pindar says, a black heart made of adamant and iron." (Plutarch.) "Some one is angry with you. Provoke him in return with kindnesses . . . Some one has struck you. Withdraw . . . A great mind that truly respects itself does not revenge an injury." (Seneca.) "Therefore if thine enemy hunger, feed him; if he thirst, give him drink: *for in so doing thou shalt heap coals of fire on his head.*" (Romans xii. 20.) Which of these sayings manifests the genuine Christian spirit, that which promises the heaping "of coals of fire" on your enemy's head, as an ultimate revenge for your present act of clemency, or any of the others? Such comparisons made, not only of the sayings, but of the doings of Pagan, with those of professedly Christian men, clearly show that human nature has not been altered one jot by dogmatic religion. To any reader who wishes to know what the "morality" of Pagan times really was, and

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what utterly fallacious hypotheses have been promulgated to its discredit, by unscrupulous, so-called Christian partisans, we strongly commend the perusal of Mr. Farrer's able and impartial work. To return to Professor Redford: "The conscience of man requires both for its enlightenment and support the ideas and practice of religion. Where there is no kind of worship, no fellowship on any higher ground than social instinct or common earthly pursuit, it is difficult to see how moral sentiment can be maintained. Morality sinks into a calculation of advantages, or into the still lower depth of pride—the worship of our own greatness in isolation from our fellows." We contend that the moral sentiment is maintained, has been maintained, and will be maintained without the practice of Professor Redford's religion. We contend that, at the present moment, ninety-nine out of every hundred men are, according to their organic potentialities, practising "morality" without even taking to heart what Professor Redford's religion means, and without even bestowing on its externals a tithe of the devotion which these men bestow on the everyday concerns of life. We contend that a majority of the professors of Mr. Redford's religion to-day, make it "a common earthly pursuit"; that they manifest as much sordid ambition in seeking its prizes as men manifest in the ordinary grovelling schemes of life. We contend that "a calculation of advantages," and "a still lower depth of pride—the worship of our own greatness," are as characteristic of the sacerdotalism of to-day—and have been of the sacerdotalism of the past—as of any body of men seeking self-aggrandizement in the professedly mercenary avocations. In other words, we contend that a professor of Mr. Redford's cult is as much the creature of organism as is any other man. "But the great want of the human heart is an object of affection which, while lifting it to the highest thoughts, fills it with the most genuine emotion." If, for "affection" and

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"emotion," we read "worship" and "reverence," the writer says "amen" to this; and because Mr. Redford's cult fails to, but Science does provide him with such an object, he prefers the Inscrutable of Science to the anthropomorphic concoction of ecclesiasticism. Mr. Redford proceeds to some wide generalizations respecting "atheism" which we are not concerned here to controvert. We will, however, enter a mild protest against Mr. Redford's misapplication of the term "atheism." According to Mr. Redford, and of course other champions of his cult, all are "atheistic" who do not hold the peculiar conceptions of "orthodoxy." Now if the "doxy" which we will assume these gentlemen really to hold, be the only one outside the "atheistic" cult, the term "atheist," although a misnomer, cannot hurt many people, and as it apparently pleases Mr. Redford, he may fling it about to his heart's content. The great mass of men, however loudly they may protest their "orthodoxy," being inwardly convinced that this "doxy" is only a skin-deep affection, will assay at its true value the "atheistic" imputation cast at those who are not too dishonest to reject a skin-deep for a to-the-bone "doxy"!

Moral, like every other sensibility, has its periods of growth and decadence, and its various potentialities of manifestation. Some men are innately less moral than others: that is to say, they have, inherently, less than the average tendency to conform to the recognized expediency. Again, where there is average potentiality for moral sensibility, other sensibilities may nullify the former. Thus, the man whom trouble has rendered desperate becomes immoral. Again, as morality depends on sensorial sensibility and memorizing power in conjunction with intelligence, when these fail, moral sensibility follows step by step. Thus, the very old man loses his moral sensibility; but, as all his other sensibilities or appetites are likewise comparatively inert, the moral degeneration is only apparent in certain directions, which do not violently oppose the

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collective expediency. "As a man advances in life, his sensibility becomes gradually lessened—the senses become dull, the sight loses its sharpness, the skin its impressionability by external agents. A sort of general slackening of all his functions impends over the living creature thus arrived at the retrograde phases of his evolution. This condition of diminution of the peripheral sensibility is reflected in a similar manner upon the sensibility of the central regions. Moral impressionability and emotivity lose their energy as a man grows old. He is less and less interested in external things capable of exciting his mental activity. He is less sensitive, less impressionable, less curious as to knowledge and feeling, and, at the same time, his intellectual faculties are simultaneously impaired. Memories of the past, like phosphoric gleams, persist for a certain time, to the exclusion of more recent remembrances; but in the end even they are extinguished, so that the circle of bygone things narrowing by degrees, the individual feeds his sensorium only with the current operations of life. Material life, with all its necessities—eating, drinking and sleeping—becomes, little by little, the favourite occupation of organisms in the period of decadence; and as to moral sensibility, the old man, an egotist, with few exceptions, is reduced to vegetative life, and becomes once more a child, caring no longer for those who care for him day after day. He forgets his old friends, and the most natural family connections, for the sake of the newest comer, and, succumbing more and more to the interested demands of his personality, he arrives, as regards moral sensibility, at a true anæsthesia, which reflects the languishing condition of the element of his nervous activity." (Luys.)

Memory is the manifestation of the power of cerebral cells to store up nervous vibrations and reproduce them, as the collodion-plate reproduces the ethereal vibrations. This cerebral power is a scientifically ascertained fact. "This

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curious property, which inorganic substances possess, of preserving for a longer or shorter period a species of prolongation of the impressions which have first set them in motion, is found . . . in the nervous elements. These are gifted with a sort of organic phosphorescence, and are capable of vibrating and storing up external impressions for a certain time in a sort of transient catalepsy, in the vibratory state into which they have been incidentally thrown, and of causing the first impressions to revive after the lapse of time. . . . It has been calculated by Platau that this persistence of impressions may be estimated" (in the case of the retina) "at from thirty-two to thirty-five seconds. To this persistence of vibrations, and that special retentive force which the nervous elements possess, is due the fact that two successive and rapid impressions become confounded, and thus give a continuous impression: that a live coal whirled round at the end of a string gives the impression of a circle of fire: that a disc, painted with the colours of the spectrum, when in rotation gives only the sensation of white light, because all its colours are confounded, and form for us a unique resultant, which is the idea of white." (Luys.)

By means of this cerebral capacity to accumulate and reproduce nervous movement, originally projected from the various peripheral sensibilities, which were themselves excited by the outside world, we learn to identify objects, to judge motives, to compare present with past impressions, to discriminate. According to its efficiency or inefficiency, we shape our conduct. We are absolutely the creatures of this mental apparatus. We cannot increase or diminish its potentiality. It is irrevocably the arbiter of our lives.

By this memorizing faculty hereditarily developed through bygone ages, we perform all our automatic, and most of our conscious acts. By it we dream, somnambulate, place our hand in our pocket, twirl our walking-cane, solve complex questions, take momentous resolutions. With the intelligence,

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it is the effective sum-total of humanity. Without them man becomes motiveless matter. What we conventionally call volitional acts are merely the outward manifestations of reactions of certain cerebral plexuses on one another, otherwise present experience affected by persistent reminiscences over which the personality has no control. According to the abundance and integrity of these established channels of reminiscence, the individual is rash, or prudent, virtuous, or vicious. These reminiscent powers of the brain are exercised consciously and unconsciously. To prove the latter, there are abundant instances in medical records. Here are some: A soldier was shot in the head. His sensorium was almost cut off from external impressions. Sometimes he was impelled solely by automatic reminiscence. A walking stick placed in his hand reminded him of a gun. He placed himself in the position of firing. A pen placed in his hand incited him unconsciously to make the motion of writing. Again: a ropemaker, seized with a fit of somnambulism while twisting a rope, would continue the operation when asleep. Again: a woman, formerly a bandage-roller at an hospital, blind, paraplegic and insane, would, while lying on her back, unconscious, proceed to automatically make a rolling motion on having a piece of linen placed in her hand. Such instances might be indefinitely multiplied. They show that, like the collodion-plate, or the phonograph, the cerebral plexuses have the power of retaining and reproducing impressions, and that such reproduction may be quite independent of the conscious personality. Indeed, we need not go to cases of cerebral degeneration to illustrate this automatism. It is manifested in each of us daily. We consciously, say, originate a thought only to abandon it. Soon we find it reappear, strengthened and completed by the automatic action of the reminiscent powers of the brain. As an instance of this class of mental action, we may adduce the common circumstance of ineffectually trying to remember a

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name. All we are then conscious of is a vague effort which we continue for a short time, then abandon. "Ego" forgets the matter; brain, however, grips it with bull-dog tenacity, and using its automatic powers to good purpose, soon tells "ego" what he was utterly powerless to grasp by "volitional" effort. "Now it is difficult, if not impossible, to account for this fact upon any other supposition than that a certain train of action has been set going in the cerebrum by the voluntary exertion which we at first made, and that this train continues in movement after our attention has been fixed upon some other object of thought, so that it goes on to the evolution of its result, not only without any continued exertion on our parts, but also without our consciousness of any continued activity." (Carpenter.)

Of course, this "voluntary exertion" to which Dr. Carpenter refers is really an unnecessary distinction. It is, in reality, no more characteristic of human personality than is the automatic exertion. Fundamentally, there is no more "ego" about the one than the other. Both, with other phases of activity, are equally, but nowise unequally, manifestations of that complex mechanism—human individuality.

Let us see what "voluntary" means in the present instance. We want to remember this name, and we "voluntarily" try to do so. But we do not "voluntarily," but "involuntarily," *want* to remember it. Desire is not an effect of "will." On the contrary, "will" is a consequence of desire, which is an automatic sensibility. Consequently, behind the "voluntary" *trying* to remember, there is an "involuntary" *wanting* to remember. Now, let us see whether there is anything behind this "involuntary" *wanting* to remember. Let us assume that this individual, a new acquaintance, has asked us to dinner. We now find that our "involuntarily" *wanting* to remember, and our "voluntarily" *trying* to remember, are dependent on another

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"involuntary" cerebral action: the anticipation of a dinner. Then this results: even if we grant this "voluntary" character to the action of trying to remember, we find that it is simply one of three sequential effects begun in the "involuntary" phase of mental effort: otherwise, that the "voluntary" is merely the issue of the "involuntary." There can, evidently, under these circumstances, be no reason why we should not discard the term "voluntary" as being here superfluous and implicative of fallacy. If we thus trace to their source all our so-called voluntary actions and thoughts, we shall always find that source to be cerebral automatism. Perhaps this will become more apparent when we have further considered the departments of cerebral sensibility.

"The conductility and dispersion of sensibility in the sensorium, by means of the nerve-fibres, is so real that, in persons who have suffered amputation, when any irritation attacks the stump and engages the sensitive nerves, it immediately awakes and develops in the sensorium the old impressions in a posthumous form. It is not simply the painful state of the sensitive nerves that the patient feels; it is the resurrection in the sensorium of a portion of himself, in consequence of the persistence of the conductors which formerly supported it, and in which this sensitive portion of his personality was incarnate." (Muller.)

People thus mutilated, refer to sensations in their limbs just as if the latter existed intact. They say that they feel pain, tickling, itching in this or that toe or finger, exactly locating the sensation, which they seem to experience in the missing member. The reason of this is that, in the stump, all the nerves which convey the distinctive sensations of such parts are still effectively working, and the reminiscent automatic faculty still reacts as it did when the members existed. So long as communication with the central organ is preserved, the fact that the original termini are non-existent does not affect the reminiscence which is true to the original sensation. But let the nerve itself be merely

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divided, then the non-communicating length is entirely devoid of sensibility. The nerve itself is dead to sensation unless in communication with the sensorium. A similar illustration is the operation of replacing a nose destroyed by disease or absent at birth. In such case a triangular piece of skin is cut from the forehead, so as to be attached only at its apex to the root of the nose between the eyebrows. It is then folded over downwards, and sown on to the skin of the face in a proper position. The new nose soon grows on completely, but this remarkable effect ensues—for a short time, until the individual has learnt to properly re-associate the altered locality of the skin, if the nose be irritated, say by pricking, he does not feel the sensation in it, but on the forehead.

Hypnotism would seem to depend on the artificial excitation of a reminiscence strong enough to overpower ordinary morbid or normal impulses. Hypnotic subjects suffering from various forms of mental derangement, have their morbid impulses controlled and sometimes permanently nullified by the force of suggestion which arouses a preponderant reminiscent impression opposed to the morbid impulse. Whenever the latter is excited, the artificially fixed impression, instead of the immediate impulse, affects the efferent nerves by which "volition" is manifested, consequently dominating the individual's thought and action. The success of hypnotic suggestion depends on the natural impressibility and retentive power of the cerebral areas, and, as this varies, the individual is more or less amenable to the influence.

It has been suggested that the hypnotic state is tantamount to a reduction of the cerebral faculties to mere automatism; however, this is only true to the same extent as with regard to normal cerebration, inasmuch as automatism is the foundation of all mental action, which, as already shown, depends for manifestation on a struggle between sensorial irritation and reminiscence. As the one

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or the other preponderates, so the individual thinks and acts. When hypnotized, he is under the dominion of reminiscence more powerful than the immediate sensorial excitation, or than pre-existent reminiscences. The great object, in hypnotic suggestion, would seem to be so to impress the cerebral "collodion-plate" by repeated suggestion, that the picture, whether true or false, shall be thoroughly fixed and more vivid than those impressions which it is desired to annul.

The possibility, illustrated by hypnotism, of impressing the subject, according to the wish of the operator, is evidence that "free-will" is a myth. It confirms the rest of the evidence bearing on the subject. Given an adequate preponderance of hypnotic reminiscence, there is no limit to the deviation from normal thought and action which may be thereby induced.

At a recent meeting of psychologists held at University College, London, Professor Deldoeuf instanced the case of a high official "whose nervous, agitated state had rendered him unhappy for twenty years." The professor convinced this subject, without sending him to sleep, that he had the faculty of not feeling pain. A needle was passed through the subject's arm and he did not wince. Thus, argues the professor, I showed to him the power of his will. We venture to demur to the professor's deduction regarding will-power. We assert that the experiment proved, not the power, but the powerlessness of the "will." It showed that the peripheral irritation had been nullified in the sensorium by the professor's counteracting suggestion: that the needle had been less successful than the professor, in impressing the sensorium; and that even a professor of hypnology had been hypnotized by conventionality into reversing the plain teaching of his own experiments!

At the same meeting, Dr. Bramwell, of Goole, mentioned patients of his who go to sleep, have teeth painlessly extracted, go sea voyages without suffering sea-sickness,—

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although normally subject to the affection,—simply through carrying about and consulting the doctor's written orders that they are to feel as he directs. These talismans are quite sufficient to ensure, in the patient's brain, a continuous revivification of reminiscence overpowering other sensorial irritation. As we knot our handkerchief in order to awaken a special reminiscence according to which we desire to act, so these people carry about and consult the doctor's written orders, in order to awaken special reminiscent vibrations which they wish to dominate their sensibilities. In the above instances, these hypnotic reminiscences were desired, and to benefit the patient; but there is no reason why similar means should not produce opposite effects. All that is needed, in hypnotism, is sufficient nerve-force emanating from the operator, and suitable impressibility in the patient; then we may establish a reminiscence powerful enough to predominate over other sensorial excitations.

This effect is persistent for varying periods, according to the retentive power of the reminiscent areas—in other words, the "image" on the "collodion-plate" may, sooner or later, lose its vividity; then the patient goes to the doctor for a fresh discharge of nerve-force by which a new "image" is imprinted.

The vital importance of this phosphorescence or reminiscent power, in the cerebral economy, must be apparent to the most superficial observer. According to the susceptibility and richness of the cerebral connections and ramifications, this power more or less readily manifests itself and fashions the actions of the individual, instantaneously and automatically directing his course, whenever stimulated to activity by a new excitant. Thus is man the creature of his conformation. Every new sensation we experience goes through the ordeal of examination by the reminiscent faculty. It is the fire which refines the ore of sensation into the metal, more or less pure and precious, of conscious

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thought and action. It manifests itself either in the act of conscious or unconscious memory, telling us facts which we intentionally seek, or, without the connivance of the personality, compelling us to abide by the result of its comparison of bygone experiences with the latest sensual impression. We have as clear proof that this phosphorescence is a reality in the brain as in the collodion plate. The instance mentioned of its manifestation in the visual centre is merely one in which it may be readily identified. Thus, the auditory nerves preserve for a long time the impressions which have set them vibrating. For hours after a railway journey we may hear the rattle of the carriages. A musical air which has forcibly impressed the ear, continually thrusts itself, uninvited, on our attention. "After long musical *séances*," says Dr. Moos (of Heidelberg), "the sounds persisted for fifteen days in one patient, and in another, a professor of music, for several hours after each lesson." (Luys.) We see the same power manifested in the gustatory plexuses, which retain the sensations, agreeable or disagreeable, which have affected them. A familiar instance is the mouth which waters at the rejuvenated impression of something which has gratified the palate. "This species of histological catalepsy, which to some extent polarizes the nerve-cells in the situations in which they have been immediately placed at the time of their first impression, is not merely a unique phenomenon, which is met with in the peripheral regions of the nervous system; it is also met with still more fully developed in the central regions of the system, where it appears with such pronounced and fixed characters that we might say that it governs the manifestations of automatic life in the spinal cord, and directs those of psycho-intellectual activity in the brain. In the different segments of the spinal cord the persistence of impressions reveals itself very evidently in the accomplishment of all those co-ordinated movements which, not being a part of the hereditary patrimony of the

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motor apparatuses of the organism, are therefore acquired by habit, being the direct product of education." (Luys.)

Thus, such exercises as dancing, fencing, boxing, writing, speaking, playing on musical instruments, which, at first, are matters of difficulty, become after a time, as it were, parts of our natural bodily functions: automatism then replaces conscious effort; the phosphorescence of the brain saves us the trouble of conscious application. What we originally performed clumsily, we now do perfectly, through the latent aptitude of the excito-motor cells of the spinal cord for recording and reproducing the excitations which first affected them. "It is then our first impressions that vibrate in us like distant echoes of the past, and serve as a stimulus to the excitations of automatic life. It is they that, always alive, always faithful to themselves, are incessantly disengaged in the form of unconscious reminiscences, regularly rhythmic motor manifestations, which faithfully reproduce the impression of the primordial excitation." (Luys.)

Philosophers have for ages been reasoning about a metaphysical "mind": trying to evolve from their "inner consciousnesses" that, as they supposed, all-important entity, the human "ego." They have treated the automatic machinery of the brain as quite of secondary importance in comparison with a certain assumed non-automatic immateriality for which they were industriously groping. Science now saves them further trouble in that direction. She shows that they have been rushing about and knocking their heads against corners, all to no purpose. What they have been seeking never existed: that goal of philosophic research, the conscious "ego," is a no more important personage than the unconscious "ego," from whom he is no more to be separated than is heat from fire.

Let humanity once firmly establish a subjective conclusion, no matter how absurd and contrary to the usual experience of mankind, and only Nature herself can drag humanity and

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that conclusion asunder. Age after age, with never-failing equanimity, men argue and re-argue from the basis of error which they inherited with their milk-teeth. But one day Nature shakes up her human family, and heigh, presto! away goes the illusion into the abyss of annihilation. Men rub their eyes and exclaim, "What noodles we have been!" Surely humanity have now had sufficient teaching by the past, to firmly reject any assumption not based on Fact and comformable with Fact!

JUDGMENT—or, as its highest form of manifestation: reason—is the reaction of accumulated sensorial reminiscences on fresh excitations. If the sensorial reminiscences are rich enough to properly react on the new impulse, the individual is said to judge prudently or rationally. If they are too weak to actively manifest themselves, the individual is carried away by the sensual impulse. He is said to judge rashly or irrationally. He readily falls a victim to circumstances and delusions. Most criminals, human "failures," and enthusiasts are of this type.

If the sensorial reminiscences are too strong, nullifying new excitation, the individual is timid, irresolute, too cautious.

The judgment thus expresses the sum-total of the cerebral idiosyncrasies of the individual. By it, his innate predispositions manifest themselves. It is his conscious personality; to make up that conscious personality, the automatically-working parts of his brain have co-operated. Thus consciousness is the outcome of unconsciousness: automatism becomes animalized.

As no two brains are constituted absolutely alike, so no two men judge absolutely alike; and as all individual judgments are manifestations of sensibilities unconsciously affecting the individual, such judgments are naturally prone to err. The only judgments which cannot err, are those which universal experience verifies. Such are the fundamental verifications of Science. What is true in

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mathematics in London, is true all over the world. The human personality has no more to do with the genesis of such truths than with the genesis of the ocean. All that humanity does is to discover them. When discovered, they can no more be demolished than the sun. In these essentials the truths of Science differ from the assumptions of Dogma: the first are impersonal, verifiable by universal experience; the others are personal, verifiable by no experience. When Science contradicts Dogma, we must annihilate reason, or believe Science.

Allied to these fundamental scientific truths are the fundamental moral verifications we call common-sense. This is the result of one constant groove of sensibility which Nature has implanted in humanity, thus binding together mankind by a common sympathy. Everywhere and always, we may assume that men have approved patriotism, honouring our parents, loving our children—in a word, doing to others as we should like them to do to us. All rational people acknowledge the force of such verifications, although many are innately incapacitated from fully conforming to them.

WILL is the resultant of the judgment outwardly manifested by action. As the judgment is an inward manifestation of the cerebral sensibility—the likes and dislikes—of the individual, so is the will an outward manifestation of this sensibility. The aim of the will is to gratify the organic sensibility. This is paradox, but also truth. Much as we may flatter ourselves to the contrary, will is selfishness in action. The philanthropist, the pietist, the moralist act their parts to gratify themselves! "On this point, the controversies of philosophers and metaphysicians, which have been taking place from time immemorial, have succeeded in arriving at but one thing—the expression in sonorous language of their ignorance, more or less complete, of the fundamental characters of psychical life. . . . On the other hand, since human sensibility is in itself

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one of the most mobile of things, and as regards this, everyone takes his pleasure as he finds it, it results that the manifestations of sensibility will vary infinitely according to individuals, and will sometimes assume paradoxical forms outside of the usual modes of common sensibility. But at the bottom, although the sentiments of egotism and personal satisfaction may apparently be masked, the manifestations of the will will always demonstrate their derivation from the same origin. Everyone, as we have said, has his mode of feeling, and just as we see individuals experience satisfaction in certain enjoyments which they alone are capable of perceiving, so we find them manifesting these different states of their sensorium in eccentric and extravagant forms. Thus it is that the enthusiasms of generosity, self-abnegation, even self-sacrifice, are but too often only a disguised manifestation of egotism, a mode of *feeling, sui generis,* in which we exchange a physical advantage for an emotion of the moral kind." (Luys.)

INTELLIGENCE is that operation of a part of the frontal lobes which transforms the automatically projected impressions of the memorizing and sensorial regions into conscious perception. As soon as these automatically projected sensorial and reminiscent impressions reach the frontal areas which produce the effect called attention or intelligence, there is, at once, an erethism or irritation of such "attention"-areas, which then appropriate and metamorphose the sensorial impressions last transmitted by the peripheral sensibilities and the latent reminiscences which these sensorial impressions have called to activity. Accordingly, in this "attention"-area of the brain, the automatic sensibilities are transformed into conscious activity proper. According to the efficiency of the co-operating automatic centres, this conscious activity results in a high or low order of intelligence. It cannot, of its own initiative, in any way remedy defects of the automatic sensibilities, on which its own activity absolutely depends.

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We thus see that no particular part of the brain contains that mysterious "mind" about which metaphysicians have, for ages, been hair-splitting and word-twisting. We find that this "mind" is a sensitive combination of fibres and cells, each with idiosyncrasies enabling it to transmute in a specific manner all the excitations to which it is sensible. The force behind this "mind" we know nothing about, and probably never shall while living mortals. Equally with the forces behind the gastric juices, behind electricity, behind heat, behind the universe, this "mind"-force is unfathomable. Yet it is no more mysterious than the others. A moment's consideration will convince us that the power which transforms all sorts of food into one living organism is quite as marvellous as that which transforms all sorts of external phenomena into one "mind." We need exert our ingenuity no more to prove supernaturalness for the one than for the other. Of course, we know that "inspired" seers think otherwise; however, ordinary men who constitute the mass of humanity prefer facts to visions: they like to conceive their supernatural as conformable with their reason. As well may the "seer" command us to attribute his specially conceived "mind" to the liver as to the brain. As well may he assert that "free-will" is a property of the former as of the latter. To authenticate his visions, this "seer" was bound to invent a "free-will," for which he naturally selected the brain as the most suitable locality. But really there is no more opening for such an intruder in the brain than in the liver. The mechanism of the one organ is as self-contained as that of the other. The correlated circuits of action in both are equally continuous and sequential. The potentialities of both were equally fixed before they emerged as parts of a living organism.

We now see how useless are attempts to modify humanity through artificial repressive measures. Just as, in dynamics, we know that actions and reactions are equal and opposite,

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so are the reactions bound to equal the actions in all attempts to disturb the equipoise of the social whole.

The various periodical crusades against special proclivities inherent in humanity are inevitably destined to produce a corresponding recoil of feeling in the mass; the ebb must, sooner or later, equal the flow. Nature will not be forestalled. History is filled with illustrations of this truism. If national records prove one fact more conclusively than another, this fact is that man cannot alter human nature; that, for good or evil, man is the creature of his conformation.

The enthusiasts who lead crusades against Nature are the resultants of one special groove of cerebral sensibility unduly developed. They are essentially deviations from the healthy cerebral type, generally of the hysterical or epileptic diathesis. The inactivity of their peripheral sensibilities renders such people indifferent to the likes and dislikes of the majority, and, through similar sensorial inefficiency, the aged are usually the disciples of such propagandists whose whole object resolves itself into a gratification of their own special abnormal sensibility. This, like any other unduly stimulated passion, tends to dominate the personality and, ultimately, to render its possessor a monomaniac.

Science now enables us to see, in their true characters, all the human achievements which have dazzled, delighted, or horrified mankind. All the saintliness, all the villainy; all the heroism, all the cowardice; all the genius, all the incapacity, stand revealed as the inevitable effects of molecular motions and combinations working under the eternal law decreed as an instrument by that Power which gave primal impulse to the universe.

Compared with this unutterably awe-compelling revelation, what are the grovelling conceptions of Dogma—her quibbles, definitions, metaphysics, canons, synods, all the paraphernalia by which she has hoodwinked humanity?

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What is a magnified man-fetish which deals with mankind by the standard of a Corsican vendettist, compared with the Inscrutable revealed by Science? Does not the insensate vanity of Dogma's pretensions irresistibly compel the contempt of every being capable of realizing, however faintly, the awful omnipotence which Science now attributes to the Maker? What are our petty foot-rule ideas of good and evil, in the presence of this stupendous scientific verification? Is it not evident that such ideas are merely the animalized conceptions of some absolute reality which transcends our apprehension: that they are akin to the sense-illusions by which we transform ethereal and aerial motions into the impressions of light and sound? Could we perceive "evil" and "good" as Science perceives light and sound, we should find as much difference from reality in our moral as in our merely sensual impressions.

Science deals with fact; yet, in doing so, she gives us glimpses of supernatural vistas, in trying to convey which, the earthy metaphysics of Dogma can only invent grotesque parodies of possibility, after the fashion of those pantomime-ogres which impress children but send adults asleep. Not Science, but Dogma is incompatible with the supernatural! Science drives us to it; Dogma drives us from it! Science proves it an awful reality; Dogma debases it into a pitiful raree show!

"We see then . . . that the sensitive plexuses of our whole organism are all either isolatedly or simultaneously thrown into vibration according to their various tonalities. They thus become like vast vibratory surfaces, of which the oscillations, registered as they arrive, are incessantly transmitted to other parts of the system, and felt in the sensorium in a corresponding manner. It is a continuous, regular, imperative work, which is accomplished every moment, from the peripheral to the central regions of the system; and this uninterrupted appeal from the external world is so necessary, so much the obligatory condition of

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all cerebral activity, that the latter ceases at once when its means of alimentation from without are cut off (loss of consciousness, sleep, lethargy), just as we see the phenomena of hæmatosis cease when the atmospheric air suddenly ceases to enter the recesses of the respiratory channels." (Luys.)

Ferrier, Horsley, Schäfer, Hitzig, Goltz, Schiff, Brown-Sequard, Luys, Charcot, Fournié, Bois-Reymond and others have now placed on a sure basis the localization of the cerebral faculties. By experiments with the electric cautery and other agents on living organisms, the visual, auditory, tactile, olfactory, gustatory, and motor centres have been located. When such centres have been destroyed, or rendered inactive, the respective faculties disappear. Every day further evidence in this and cognate directions accumulates, so that we may assert that the practical possibilities of the human mind have now been determined. Experiments on the lower animals have shown how the muscular system is excited by stimulation of certain brain-areas. In the experiments, electricity has been made to effect the same purpose as normal vital stimulation by nerve-currents. At the will of the operator, according to the cerebral convolution electrified, the eye, tongue, neck, and other parts of an animal are caused to move. It has, further, been experimentally proved that such effects are produced on man as readily as on the lower animals. Cranial degeneration has afforded the opportunity for the requisite experiments. Again, it has been proved that, after death, manifestations of automatic life reappear in the direction established by previous habits and inclinations. Brown-Sequard injected the head of a dog when separated from the trunk with defibrinated and oxygenated blood, and at the moment when the injection of this blood had recalled manifestations of life, he called the dog by name. The eyes of the head thus separated from the trunk turned towards him, as if the

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voice of the master had still been heard and recognized. (Annales' "Medico-Physiol." 1870.) We need scarcely emphasize the significance of such facts in their bearing on the doctrine of "Will." We will now proceed to details of some of the latest experiments to localize the cerebral faculties. These, taken in conjunction with the other verifications affecting the question can lead to but one conclusion: that the "free-will" assumption is a scientifically demonstrated fallacy.

There can be no doubt that, sooner or later, Science will have experimentally identified each area of the brain, controlling one or another of all the effects of what we call mind. Immense strides have been taken within the last few years towards this result. Professor Ferrier, in his Croonian Lectures, delivered before the Royal College of Physicians, June, 1890, has demonstrated that, in various animals—cats, dogs, monkeys, rabbits, (1) Electrical stimulation of an area between the prefrontal lobe and the precentral sulcus causes "opening of the eyes, dilation of the pupils, and movements of the head and eyes to the opposite side. This area has been further differentiated by Beever and Horsley, according to the primary movements which result from minimal stimulation of the points indicated on their diagram." (Ferrier.)

2.—"Stimulation of an area at the upper extremity of the central convolutions (ascending frontal, ascending parietal, and postero-parietal lobule) and extending over the margin of the hemisphere into the posterior part of the marginal convolution . . . causes movements of the lower extremity. The movements vary according to the position of the electrodes on this area. Behind the fissure of Rolando the movements are chiefly, or exclusively of the foot or toes. Anterior to the fissure of Rolando they are combined with flexion of the leg and thigh. With minimal stimulation the movements may be still further

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differentiated, and, in particular, the great toe can be excited to movement separately by stimulation at the upper extremity of the fissure of Rolando." (Ferrier.)

3.—Stimulation of an area, below the leg area, "and partly in front of it, and occupying the middle third, or rather two-fourths of the central convolutions, causes movements of the upper extremity. In this area it is possible to differentiate, more or less completely, movements of the upper arm (protraction and retraction); movements of the forearm (flexion, supination, &c.); and of the wrist, fingers and thumb." (Ferrier.)

4.—"By minimal stimulation at the lower extremity of the intraparietal sulcus the thumb may be individually thrown into action." (Ferrier.)

The above refers to the monkey. The corresponding areas for dogs, cats and rabbits are also detailed.

5.—Stimulation of an area below that of the arm causes movements of the face, mouth and tongue.

"It has further been demonstrated by Semon and Horsley that excitation of the lower extremity of the frontal convolution causes phonatory closure of the vocal cords. The phonatory closure of the vocal cords was first demonstrated ocularly in the dog, on irritation of the pre-sigmoid region, by Krause, though I had many years previously given audible demonstration of the fact by showing that stimulation in this neighbourhood not infrequently caused barking; and similar effects (spitting, mewing) by stimulation of the homologous region in the brain of the cat." (Ferrier.)

"The areas for the head and eyes, arm and leg, extend over the margin of the hemisphere into the mesial aspect or marginal convolution. These I had to some extent noted in my first experiments, but a more thorough exploration of the reactions of this region was first made by Horsley and Schäfer. Excitation of this convolution from before backwards causes movements of the spine, tail, and pelvis; behind these, extension of the hip, flexion

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of the leg, and, lastly, movements of the foot and toes. . . . Stimulation of the angular gyrus . . . causes movements of the eyeballs, and occasionally of the head, to the opposite side, generally combined with an upward or downward direction, according as the electrodes are on the anterior or posterior limb of this gyrus. . . . Stimulation of the superior temporal gyrus causes pricking of the opposite ear, opening of the eyes, dilatation of the pupils, and direction of the head and eyes to the opposite side. Precisely the same reaction occurs after stimulation of the posterior limb of the third external convolution of the brain of the dog, and so also in the brain of the cat, and homologous region of the brain of the rabbit. Sometimes only movements of the ear are caused, and sometimes the animal attempts to bound off the table as if suddenly startled. Stimulation of the hippocampal lobule or anterior extremity of the hippocampal gyrus in monkeys, dogs, cats, and rabbits, causes precisely the same results—namely, torsion of the nostril on the same side—as if from irritation applied directly to the nostril itself." (Ferrier.)

We here see the same force, electricity, according to the part of the brain to which it is applied, producing the effects of sight, hearing, and smell, and thus imitating the effect of nerve-force on the peripheral sensibilities. Now, if similar effects can be demonstrated to take place in man, as we shall see that they can be, it will not be a particularly bold deduction to assume that one force, say ethereal vibration, acting on specific brain-areas through specific nervous channels, or on various areas in combination, produces every mode of cerebral action included in the term, mind; that, according to the development of communications between areas, the individual is of the average mental tendency, or differentiated from it, and that the resulting actions and thoughts are entirely dependent on this cerebral conformation. We cannot, by any rational process of reasoning, import an outside factor, such as

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"free-will," into the question, because we do not need such a factor to explain any effect which we know to take place. There is no mystery to explain, in the process of thought, which does not baffle us when we seek the ultimate of every vital function—in fact, of every circumstance of our existence; yet, in no case, except in connection with cerebral action, do we seek to transcend natural explanation. Why, out of all the phenomena of life, should we select one in which to try to demonstrate the existence of a supernatural factor, which has no conceivable connection with the requirements of human reason, inasmuch as it accounts for nothing which natural factors do not fully explain? The answer is: because, until the last few years, men were densely ignorant as to the brain's action and mechanism, and because a theological system found "free-will" an essential to its pretensions. No doubt the conception, although fallacy, has not existed for the mere purpose intended by its originators — humanity is but the puppet of the Inscrutable. "Free-will" was once needed in the process of evolution; logomachists with pet theories, invented it. It is needed no longer; Science, the servant of Truth, has demolished it! Fallacy undetected, may reign; fallacy detected, must unconditionally abdicate.

"Whether complete parallelism obtains between the brain of the monkey and the brain of man is a question which, until recently, could only be answered by reference to the facts of localized lesions. Bartholow and Sciamanna had observed movements of the opposite side of the body on stimulation of the cortex through the dura mater—the former in a case of cancerous ulceration, and the latter in a case of trephining. But their results, though so far in accordance with those of experimentation on monkeys, were lacking in precision. Recently, however, surgeons have on several occasions resorted to gentle faradisation of the cortex, in order to define accurately the regions which they

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have desired to extirpate for the cure of focal epilepsy. One of these has been reported by Horsley, and several others have been quoted by Mills in his valuable memoir on 'Cerebral Localization in its Practical Relations.' 'Four distinct responses in the shape of definite movements were obtained after several trials; these were (1) in the most anterior position at which movements resulted, distinct conjugate deviation of the head to the opposite side; (2) a little below and behind this point, drawing of the mouth outwards and upwards; (3) above this spot for movements of the mouth, about half-an-inch, extension of the wrist and fingers was produced; (4) behind and above the latter point, distinct flexion of the fingers and wrist. Continuing and increasing the faradic application at this last determined point, the fingers, thumb, wrist, and fore-arm were successively flexed, and the whole extremity assumed the wing-like position.' In a second case reported by Keen: 'On touching the cortex with the electrodes at a position which apparently corresponded to the anterior portion of the pre-Rolandic convolution, just behind the precentral fissure, movements of the wrist and fingers were produced. The hand moved in extension in the mid-line and to the ulnar side at different touches, the fingers being extended and separated. Above the region in which these movements were obtained, application of the current caused movement of the left elbow, both flexion and extension, and of the shoulder, which was raised and abducted. Below the region, where the hand movements were excited, the application of the current produced an upward movement of the whole of the left face.' In another case reported by Lloyd and Deaver, an area was exposed in the right hemisphere corresponding to the junction of the middle and lower thirds of the central convolutions. When the electrodes were applied to a point just posterior to the fissure of Rolando, the movements which occurred were in order: flexion of the thumb on the palm, flexion of the fingers,

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flexion of the wrist, extending to flexion of the elbow. At a point in front and below, stimulation caused contraction of the facial muscles. In a fourth case, reported by Nancrede, movements of the thumb were induced by stimulation of a region corresponding to the second lower fourth of the ascending parietal convolution. *All these results are in close harmony with those obtained on stimulation of the cortex of the brain of the monkey, and we have therefore every reason to believe that caeteris paribus, the functional relations of the human cortex, are identical with those of the lower animals.*" (Ferrier. Italics, author's.)

We thus see that the human brain responds exactly as does the brute's to electrical stimulation, and that the areas, as a whole, are differentiated. No movement of a leg results from irritation of a facial area, nor of the face from irritation of a leg-area. This shows that the differentiated areas have been ascertained. Now, all these movements of eyes, head, face, limbs, and members, if performed by a conscious individual, would be called voluntary. But, if all these movements can be obtained by the operator, without the co-operation of the personality and without mechanical force, simply by compelling the brain to work independently of any "ego," does not this fact cut away, to demonstration, practically all the attributes involved in the conventional conception of volition? What is left by which to distinguish this "volition" from automatism? Consciousness? But consciousness is merely a phase of cerebral action dependent on specific irritation.

These movements of the head and eyes, above referred to, are, according to Ferrier, whose conclusion has been confirmed by the experiments of Schäfer, "signs of the arousal of subjective visual sensation:" that is, of actual sight as ordinarily understood. They represent true sight, minus all other consciousness. This, again, confirms the assumption that consciousness itself, the mainstay of metaphysics, is divisible into composite parts; that, as already stated,

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it is merely the equivalent of sensuous impression; that there is nothing of the "ego" about it; that any specific part of it may be artificially aroused, concomitantly with the specific irritation, and limited to it.

Again, the destruction of the various centres, instead of their stimulation, confirms the lesson of the latter procedure. There is no need to detail such vivisectional experiments. It suffices to state: "My own experiments, as well as those of Munk, Horsley, and Schäfer, show that when the lesions are strictly limited to the visual sphere, vision alone is affected or abolished" (according to the area destroyed) "without any implication of the other forms of sensibility, general or special, and absolutely without any motor paralysis." (Ferrier.)

The significance, as bearing on the "free-will" contention, of the fact that these manifestations under electrical stimulation are true subjective sensations, is most striking. We have quoted Ferrier's observations on their subjective character in respect to visual areas; we will now add an extract from his remarks on auditory stimulation. "Among the reactions consequent upon electrical stimulation of the cortex there is one, or rather an assemblage of reactions, which might almost be considered of itself indicative of the existence of subjective auditory sensation; a reaction which guided me in my first attempts to define the auditory sphere by the destructive method. The reaction in question is that which occurs on irritation of the superior temporal convolution and its homologues in the lower vertebrates; namely, quick retraction or pricking of the opposite ear, associated frequently with opening of the eyes, dilation of the pupils, and turning of the head and eyes to the opposite side. These are just the phenomena which occur when a shrill sound is suddenly made in a monkey's ear, as I have found by actual experiment. The reaction, however, varies somewhat in its completeness. After the first surprise is over, the repetition of the experiment always induces the

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pricking or retraction of the ear, but generally fails to induce the other parts of the reaction, namely, the intense look of surprise, and direction of the head and eyes to the supposed source of sound. The results are still more characteristic on stimulation of the homologous region . . in those animals whose habits are such as to make their safety largely dependent on the acuteness of their hearing. The region in question is the posterior division of the third external or supra-Sylvian convolution. The reaction common to all these is pricking of the opposite ear, but the other factors vary in intensity. In the lop-eared rabbit, irritation of this region causes sudden elevation of the ear, as well as retraction and exposure of the mouth of the auricle towards the referred region of the sound. Occasionally the animal makes a sudden start and movement, as if to bound off the table. In the wild jackal, also, I observed on one or two occasions that the application of the electrodes to this region caused the animal to make a sudden spring or bound forward, pricking up both ears as if suddenly startled." (Ferrier.)

Now, it is quite clear from these experiments that, by electricity, we can compel the human brain to affect the organism, as that organism is affected by what the metaphysician calls mind. We can thus compel muscular contractions so as to produce vocal sounds and flexions of members, exactly as these arise through what is called voluntary exertion. Then we must exclude these muscular and vocal actions from the category of effects which may be assumed as emanating from the metaphysical "mind." We must place these limb-flexions and vocal actions in the category of strictly automatic phenomena. Then, let us ask, what have we left which is not, by Ferrier, *experimentally* demonstrated as strictly the result of organic sensibility? We have nothing so left except what we call the higher intellect. This intellect, we have proved to reason, is entirely the result of the phosphorescent quality by which

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the cerebral plexuses, under suitable stimulation by the peripheral sensibilities, are enabled to reproduce bygone impressions.

Again, let us ask, what is the sole machinery by which man has been enabled to raise himself above the brutes? We answer—language, or written and spoken symbols. The moment man began to employ these to represent specific objects, at that moment he grasped the opportunity of developing to an unlimited extent the phosphorescent power of his brain; not, be it observed, through the hereditary transmission of the new acquirement (this, as already explained, would be impossible), but through its transmission by direct teaching. Let the next generation be taught no language, of course it would inherit none, and though, as compared with primitive man, endowed with increased brain-power, it would practically start afresh from rudimentary savagery. So soon, then, as tradition began to operate through language, man began to soar above the brute. Give us the creature with a brain, able to signify by speech, an axe; a Homer or Shakespeare is but the inevitable issue which Time shall evolve. There is no more mystery about such evolution, than about that of a chrysalis into a butterfly; in fact, there is less. It needs little mental profundity to realize the possibilities arising from experience acting, age after age, on a thinking machine, and from the accumulation of that experience being transmitted from generation to generation.

Now let us hear what pathology has to say about "free-will." If volitional power were a part of the personality, separate from the automatic machinery, how are we to account for such affections as agraphia, aphasia, and amnesia? What is "free-will," if an educated man who wants to write, spell, or speak a simple word, name a familiar colour or object, mention his own name, cannot do so because specific parts of his cerebral machinery are disorganized? What is the utility of a "free-will" which

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cannot enable a man to overcome the effects of nerve-lesion? How can we reconcile the conception with such cases as the following?

"A scholar of Trinity College, Dublin, twenty-six years of age, of very considerable literary attainments, and well versed in French, Italian, and German, whilst sitting at breakfast, after having bathed in a neighbouring lake, suddenly had an apoplectic fit. He was reported to have become 'sensible in about a fortnight,' but, although restored to the use of his intellect, he had the mortification of finding himself deprived of speech. He spoke, but what he said was quite unintelligible, although he laboured under no paralytic affliction, and uttered a variety of syllables with the greatest apparent ease. When he came to Dublin his extraordinary jargon led to his being treated as a foreigner in the hotel where he stopped; and when he went to the college to see a friend he was unable to express his wish to the gate-porter, and succeeded only by pointing to the apartments which his friend had occupied. Dr. Osborn, after frequent careful investigations, ascertained the following particulars concerning his patient:—

"1. He perfectly comprehended every word said to him.

"2. He perfectly comprehended printed language. He continued to read a newspaper every day; and, when examined, proved that he had a very clear recollection of all that he had read. Having procured a copy of Andral's 'Pathology' in French, he read it with great diligence, having lately intended to embrace the medical profession.

"3. He expressed his ideas in writing with considerable fluency; and, when he failed, it appeared to arise merely from confusion, and not from inability, the words being orthographically correct, but sometimes not in their proper places.

"4. His general mental power seemed unimpaired. He wrote correctly answers to historical questions; he translated Latin sentences accurately; he added and subtracted

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numbers of different denominations with uncommon readiness; he also played well at the game draughts.

"5. His power of repeating words after another person was almost confined to certain monosyllables; and in repeating the letters of the alphabet he could never pronounce k, q, u, v, w, x and z, although he often uttered these sounds in attempting to pronounce the other letters. The letter i, also, he was very seldom able to pronounce.

"6. In order to ascertain and place on record the peculiar imperfection of language which he exhibited, Dr. Osborn selected and laid before him the following sentence from the bye-laws of the College of Physicians, viz. 'It shall be in the power of the College to examine or not to examine any Licentiate previous to his admission to a Fellowship, as they shall think fit.' Having set him to read, he read as follows:—'An the be what in the temother of the trothetodoo to majorum or that emidrate eni enikrastrai mestreit to ketra totombreidei to ra fromtreide as that kekritest." The same passage was presented to him a few days afterwards, and he then read it as follows:—'Be mather be in the kondreit of the compestret to samtreis amtreit emtreide and temtreide mestreiterso to his eftreido tum bried rederiso of deid daf drit des trest.' He generally knew that he spoke incorrectly, although he was quite unable to remedy the defect. After the expiration of eight months, however, he was so far improved that he was able to repeat the same bye-law after Dr. Osborn as follows:—'It may be in the power of the College to evhavine or not ariatin any licentiate seviously to his amission to a spelowship, as they shall think fit.' Some little time after this, Dr. Osborn says he 'repeated the same bye-law after me perfectly well, with the exception of the word *power*, which he constantly pronounced prier. He was also able to pronounce all the letters of the alphabet except d, k, and c.' He progressed in this way under the directions of Dr. Osborn, who advised him to commence learning to speak again like a child,

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repeating first the letters of the alphabet, and subsequently words, after another person, on the ground that he had 'lost, not the power, but the art of using the vocal organs.' In this strange but very interesting case there seems to have been no appreciable mental defect. It appears conceivable that a disordered relation between the Auditory and the Kinaesthetic Word-Centres, or else a disordered activity of the latter Centres themselves, may have sufficed to induce some such defect." (Bastian.)

Here we have an educated man, in full possession of all the components of high intelligence, yet, however strenuously he "wills," unable to articulate coherent speech. Surely, if "free-will" existed, here was a case for its manifestation. Is there any need to ask why some men cannot realize the consequences of their actions, when such cases as the above are in evidence? Cannot we understand that if a sane man is unable to "will" articulation, another sane man may be unable to "will" integrity? Here are other cases:—

"The patient does not speak because he does not remember the words which express ideas. You recollect the experiment which I often repeated at Marcon's bedside. I placed his nightcap on his bed, and asked him what it was. But after looking at it attentively he could not say what it was called, and exclaimed, 'And yet I know well what it is, but I cannot recollect.' When told that it was a nightcap, he replied, 'Oh, yes, it is a nightcap.' The same scene was repeated when various other objects were shown to him. Some things, however, he named well, such as his pipe. He was, as you know, a navvy; and, therefore, worked chiefly with the shovel and the pickaxe, so that these are objects the name of which a navvy should not forget. But Marcon could never tell us what tools he worked with, and after he had been vainly trying to remember, when I told him it was with the shovel and pickaxe, 'Oh, yes, it is,' he would reply, and two minutes afterwards he was as incapable of naming them as before." (Trousseau.)

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"A gentleman, aged about seventy-five, after having walked a considerable distance on March 28th, 1864, sat down to dinner, and proceeded with his meal as usual. After a time it was observed that some water he was drinking flowed from his mouth. He put down the glass, calling at the same time in a loud and excited voice for his wife and the servant who was in the habit of waiting upon him, although they were both present. The patient was in a very short time seen by Dr. Kidd, who found him sitting on the sofa, looking puzzled but evidently conscious, calling out loudly at intervals for the servant and others, but not taking the slightest notice of anything which was said to him. The excitement under which he laboured after a time passed away. He endeavoured to speak, but unintelligibly. He walked upstairs unassisted, wound up his watch, went to bed, and slept well. The following morning it was discovered that he was completely deaf, the loudest noises not being perceived. His sight seemed good, and there was no motor paralysis of any kind. In speaking, he used wrong words, so as to be utterly unintelligible. Dr. Banks says, 'he certainly recognized me, and was glad to see me, but misnamed me; saying something, but using words without meaning. We endeavoured to communicate with him by writing, but it was evident that he did not understand it. 'Have you pain?' was written, and he looked at it and said, 'Good, good God'; appearing to read what was written. He attempted to write letters frequently, and his address was written two or three times at the head of the sheet of paper, some of the words being imperfect. 'My dear sir,' was written correctly. The sheet was filled with writing, but no word except 'wife' was legible, the rest being utterly meaningless; some letters were correctly formed, but no words until the end, where his name was signed with a steady hand and in his usual manner. He varied, however, in his power of writing at different times; occasionally when wished to sign his name, he could not be

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induced to do so, and only scribbled some unintelligible words. It was impossible to get him to understand anything; and his meaning could only be guessed at by his gestures, and by the very few words at his command, which were almost always misapplied. At the beginning of April a remittance was due from his agent, and each morning he was much excited, asking frequently for something. At length it occurred to one of the family to show him his agent's letter, which seemed to please him; but he was not quite satisfied till the money was brought and counted before him. Some shillings were not shown to him at first, but when he saw them he appeared to know all was right, and, on the money being handed to his wife, seemed content. His feelings of affection for his wife seemed to be intensified; but there was some amount of emotional weakness. He occasionally for a time made use of some one word, applying it in the most varied ways. Wishing to inform Dr. Kidd that a liniment which he had been using was nearly finished, he said, pointing to the bottle, 'Bring the cord.' On another occasion, speaking of pills he had been taking, he said he had taken 'potatoes.' Very frequently there was some similarity in the words used to the right one; or it could be discerned that there was some association with the idea he wished to convey; for example, giving his waistcoat to be put aside, the watch being in his pocket, he said—'Take care of the break-fall.' He seemed conscious of his deafness, and sometimes spoke of it. One day he said he could neither hear nor read—'Only a little, could read the words, but could not take in the meaning.' Every morning, notwithstanding, he spent some time as if busily engaged reading the Bible and the newspapers. This was doubtless from the mere force of habit; for, on testing him, he read after a fashion, but the words were unconnected and meaningless, and had not even the most remote connection with the text. His powers, both of speaking and writing, were subject to variation at different times. . . . Occasionally it was difficult to manage him; as,

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if he wished to go somewhere, and it was found impossible to comprehend his wishes, he became very much excited." (Bastian.)

Such cases as the above frequently come under the notice of medical men, and are quite explicable by injury to, or destruction of specific centres of sensibility controlling specific faculties. But, where is "free-will" under these circumstances? Does the old "ego" forsake its tenement and another take its place, the moment that tenement becomes degenerate? How else, on the hypothesis of metaphysicians, can we account for the change, and what is the value of a supernatural agent which plays such antics? It is manifest that if "free-will" and defective organism are only able to secure the above effectiveness of "volition," the former is of no account whatsoever, even if we grant its existence, in the determination of human actions.

It seems impossible for rational understanding longer to doubt that men's acts, thoughts, and feelings solely arise from cerebral sensibility. Let us apply this fact to a few sensations, say, hunger and thirst, love and hatred. These latter, like hunger and thirst, are purely the result of organic sensibility. There is no "ego" to command one more than another. Man, as a personality, cannot control the sensation of hate any more than he can that of hunger. He may, according to the strength of counteracting sensibilities, control the outward manifestations of hate and hunger; but, to what degree he *feels* them, purely depends on the nervous impressibility in sympathy with the particular excitant. Therefore, to say it is sinful to hate, is equivalent to saying it is sinful to be hungry. However, experience has taught civilized man that the open manifestation of hatred is against his collective interests, and the drift of evolution has adapted the average conformation to this experience—or, rather, we may say, that the experience is the necessary outcome of spontaneous modification of the organic type. Thus,

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the average man is naturally inclined to repress the open manifestation of hatred.

Again, experience has taught a section of the public called "society," that it is objectionable for guests to tell the host that they feel hungry. Accordingly, such "society-" people tell one another a pack of lies rather than confess that they are hungry!

The real difference, as conduct, between avowing hunger and avowing hatred, is merely the difference in numbers between those who respectively condemn the one and the other. The difference, as sensations, is merely that of the brain-areas whence they arise. However, as the majority of men represent the drift of evolution, we are bound to conclude that Nature is deciding against the conformations adapted to open hatred and that, as Darwin's law tells us, such conformations will succumb in the struggle for existence, unless they are endowed, in addition to the capacity to hate, with the ability to sham adaptability: otherwise to conceal the disadvantage.

All our moral conclusions are the outcome of previous conclusions. They were not created perfect and final any more than was man, or the monoplastid from which he originated. Man's moral conclusions, like himself, are the result of growth under Law. The expediency of majorities through ages of experiment has resulted in the expediency of our nineteenth-century majority. No doubt other majorities are destined to continue the pursuit of perfection.

Of course, Dogma tells us that man was created perfect and that his degradation was the consequence of some mysterious sin in a certain garden. For this remarkable theory Dogma gives us her usual proof: tradition. Science here gives a flat denial to Dogma. Science says that man was evolved from another type of creature from which he was originally scarcely distinguishable. For this assumption Science gives us far stronger evidence than tradition. By studying the embryos of various animals

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she finds that the more closely one creature is allied to another, the longer and more intimately do the embryos of such creatures resemble each other. Thus: the embryos of a snake and a lizard remain alike longer than do those of a snake and a bird; those of a dog and cat, far longer than those of a dog and bird, and so on through the various types of creature.

In answering the question whether man differs, in these respects, from other animals, Huxley remarks: "The reply is not doubtful for a moment. Without question, the mode of origin and the early stages of the development of man are identical with those of the animals immediately below him in the scale It is very long before the body of the young human being can be readily discriminated from that of the young puppy; but at a tolerably early period the two become distinguishable by the different forms of their adjuncts, the yelk-sac and the allantois But exactly in those respects in which the developing man differs from the dog, he resembles the ape So that it is only quite in the latter stages of development that the young human being presents marked differences from the young ape, while the latter departs as much from the dog in its development as the man does. Startling as this last assertion may appear to be, it is demonstrably true, and it alone appears to me sufficient to place beyond all doubt the structural unity of man with the rest of the animal world, and more particularly and closely with the apes."

Again, Wallace remarks: "A few curious details, in which man passes through stages common to the lower animals, may be mentioned. At one stage the os coccyx projects like a true tail, extending considerably beyond the rudimentary legs. In the seventh month the convolutions of the brain resemble those of an adult baboon. The great toe, so characteristic of man, forming the fulcrum which most assists him in standing erect, in an early stage of the embryo is much shorter than the other toes, and

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instead of being parallel with them projects at an angle from the side of the foot, thus corresponding with its permanent condition in the quadrumana. Numerous other examples might be quoted, all illustrating the same general law If we compare the skeletons of the ourang or chimpanzee with that of man, we find them to be a kind of distorted copy, every bone corresponding (with few exceptions), but altered somewhat in size, proportions, and positions."

Owen, referring to the same subject, writes: "I cannot shut my eyes to the significance of that all-pervading similitude of structure—every tooth, every bone, strictly homologous—which makes the determination of the difference between *Homo* and *Pithecus* the anatomist's difficulty."

All lines of enquiry conspire here, as in every other direction, to pulverize the assumptions of Dogma. Her six-days' creation and her originally perfect man are shown to be as absurdly fallacious theories as her "free-will" and her anthropomorphic deity. Truly, the time seems to have arrived when she may, as gracefully as possible, retire from the ramparts whence she has for so long overawed mankind!

CHAPTER IV.

ALL human knowledge is merely relative. We know nothing absolutely. We do not even absolutely know that we exist. To do so would necessitate that the individual should simultaneously know himself subjectively and objectively. I would thus have to know ME. This would involve annihilation of both, subject and object. Thus it is with everything we think we know; we only know relatively, and this limited potentiality will be ours as long as we are humanity. But, as far as humanity is concerned, this knowledge is ample.

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As little has the fish need of man's knowledge, as man the need of a knowledge of that behind his being. Philosophy, pushed to her ultimate conclusions, can only tell us the fact of this relative knowledge which she has established beyond the possibility of reversal; therefore, Philosophy would seem to have achieved her masterpiece and to be entitled to a dignified rest on her laurels. It is otherwise with Science. Relative knowledge is the means by which Nature is metamorphosing civilization and the grand object which she sets before mankind. This world of relative knowledge is man's world; to actively occupy it is of far more consequence to man than to try to invent a telescope enabling him to discern the unknowable. What satisfies man's reason is, for man, perfect knowledge: he no more requires to go beyond this than he requires to be able to exist without air.

Assuming these premisses as to the relativity of all knowledge, we have incontrovertible scientific evidence for the following facts:—All energy is manifested under Law. Atoms, the basis of matter, and molecules, the first combination of atoms, energize under Law; all solids, liquids, gases, and vapours are formed and energize under Law; all organisms have been evolved and energize under Law; all celestial bodies have been evolved, and energise under Law. The universe is in the iron grip of Law. Science infers no self-evolved Law. Hence she infers a Law-maker. This Law-maker is her Deity—the inevitable corollary of everything she has verified.

Again, whether Science comprehends the whole or only an infinitesimal part of this Law, she is determined not to yield one jot of natural inference arising from what she does know: her proofs of the universality of this Law are so overwhelming that Science absolutely scouts any theory attributing freedom to a creature. To the minutest detail of its life, Science asserts that such creature is the puppet of Law. Everything seen, heard, felt, apprehended, desired,

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achieved by such creature, emanates from the Law-maker. The absolute conviction of the stupendous actuality of her Deity is the religion of Science. To none of her truths is she, by her own methods of enquiry, more despotically bound than to the truth of her religion.

Now, this Deity of Science does not inspire his worshippers with abject fear that he will revenge himself on his creatures. Awe and reverence, the Inscrutable demands, but not the wretched terror inseparable from Dogma's implacable monster of omnipotence. With the demolition of the "free-will" conception, with the truth ascertained respecting cerebral action, this horrible figment of distempered brains: a creator who wreaks vengeance on his helpless creatures, must appear the most repugnant of conceptions, henceforth and for ever to be banished from the realms of practical religion, and, by future generations, to be linked with the various myths which, in regular succession since the first impressive natural phenomenon inspired the first man with a vague dread of the supernatural, have intimidated humanity. All the devotion, all the high purpose, which is the assumed corollary of serving Dogma's deity, is the corollary of serving the Deity of Science, with the thousand-fold intensified effect that this devotion and this high purpose are offerings to a God who commands, not merely human emotion, but human reason—a God whose essentials are entirely reconcilable with biblical narrative divested of the paraphernalia of rank superstition, in maintaining which, a pragmatical section of humanity has for ages thwarted the noblest efforts of the noblest intellects, and condemned the rest of mankind to a servile observance of forms and ceremonies, and a mechanical acceptance of incomprehensible definitions, as the only means of propitiating that Power, among whose works this earth is but a pin's head among Himalayas; yet, whose dealings the mites of this earth have presumed to determine by the measure of their puny understandings.

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Every normally constituted man who takes the trouble to question his reason as to the Inscrutable of Science will see that Science has established the existence of her Deity on an incontrovertible basis of fact. Her deduction is made only after the most ample induction; hence, the worshipper of the Deity of Science has no excuse for mechanical religion, he must understand and believe what he professes, and, understanding and believing, will naturally, according to his potentialities, conform to the ideals incidental to his convictions. His religion will be no Sunday sham—it will be an everyday reality—the most cogent fact of his existence. The religion of Science enslaves reason; therein it differs from the religion of Dogma which merely excites the derision of reason. Dogma herself has realized her affront to reason; hence she warns mankind against what she calls a lust of reason. She tells us that this "lust" is as real and deadly as another which she calls the lust of flesh. We must acknowledge the sagacity which prompted Dogma to her exposition of the lust of reason. Unfortunately, however, for Dogma, reason is no more to be denied gratification than are the lungs and heart. As well may Dogma tell mankind that there is a lust of lungs or heart, as of reason. As well may she tell us to avoid inhaling too much pure air, as to avoid accumulating too many experiences. As well may a hen try to prevent her ducklings from using their webbed feet, as Ecclesiasticism try to prevent man from using his reason. Now, reason is only fully satisfied by impersonal verifications. She tolerates personal assumptions merely as makeshifts, pending verification guaranteed by fact. Such verification Dogma persistently denies; consequently reason goes her own way to get it, and, having now attained it, cannot, if she would, conceal it from humanity. The Inscrutable decreed the revelation or man would not have discovered the truth.

Apart from "free-will," we have hitherto taken no

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notice of Dogma's peculiar conception—"miracle." We all know what marvellous virtue Dogma attaches to it, and what infinite pains able men have taken to demolish it. Further labour in that direction would seem wasted. We may allow Dogma to retain, as long as she can, the remnant of her "miracles." Whether they be credible or incredible, matters not any longer, for these reasons: that they pretend to explain nothing practically affecting mankind which Science does not *really* explain; that, apart from its practical bearing on humanity, mystery does not concern mankind.

Science says to Dogma: Granted your miracles; assume a man,—fifty men if you like,—to have gone through the clouds against gravitation, what then? How does that affect the men who cannot and have no desire to go through the clouds against gravitation? If, through your "miracles" you could prove man a free agent, then it would be worth my while to show that they are all hallucinations or impostures. As they cannot affect my verification that man is not a free agent—keep them! They may amuse you; they don't hurt me.

To Science, "miracle" is the merest commonplace. She has the same respect for it that a Houdin might be supposed to entertain for the feats of a bungling parlour-magician. She has penetrated behind "miracle"; she knows it in the "germ-cell." The time is long past when Science would seriously discuss "miracle": to measure the comparative credibilities of canonical and extra-canonical "miracle" may still be an exercise for philosophers; to scientists, it is a frivolous waste of precious time. Were there any question of that sort for Science to decide, she would certainly be disposed to place more reliance on the "miracles" vouched for by Herodotus and Plutarch than on those guaranteed by the chroniclers of the Canon; and she would rather trust the evidence of Hellenic than of Palestinian witnesses of "miracle." However, to

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Science, there is in this case, no comparative credibility; all is incredible. She has no more respect for the "miracle" of the opening of the Pamphylian Sea to allow the passage of Alexander's army, than for that of the opening of the Red Sea to allow the passage of the children of Israel; for the opening of the gates of the Heracleum at Thebes to allow Hercules to get his armour from the temple, than for the fall of the walls of Jericho at the sound of Joshua's trumpets; for the rising from their graves of Phylacus and Autonous to fight the Persians, than for the rising from their graves, after the crucifixion, of the dead saints to go into the holy city; for the sprouting beard of the priestess of Pedasus, than for Peter's fish with the tribute-money in its mouth. Science lumps all these together as amusing contributions to that class of romance known as old women's tales. For "visions," Science entertains the same respect as for "miracles" proper. She is as much impressed by the "vision" which converted Sampson Staniforth to Methodism, as by that which converted Paul to Christianity. We may as well ask Science whether there is truth or mystery in these "miracles" and "visions," as ask her whether the wise men of Gotham confined the cuckoo by joining hands round his bush; whether Cinderella's fairy godmother changed the pumpkin into a carriage and six; whether the sun moves round the earth.

Having utterly discarded *all* "miracles" and "visions," Science leaves details to the commonsense of modern society, which she recommends to take its "miracle" with such a very large lump of salt that it would be a "miracle" were it swallowed!

Dr. Maudsley, referring to the characteristics of the mania of the prophetic spirit and the mania or madness of disease, writes:—"On this subject I may refer to the Rev. Augustus Clissold's work on 'The Prophetic Spirit in its relation to Wisdom and Madness,' from which I have

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taken these quotations. Mr. Clissold points out what he considers to be the inconsistency of those who accept the divine origin of the visions of the prophets of the Old Testament, and at the same time reject Swedenborg's visions and repudiate his prophetic claims. . . . There was the mania or madness belonging to the prophetic spirit" (the writer is here referring to the notions of antiquity) "and there was the mania or madness of disease, running at times so close to one another as not to be distinguishable. The prophets of the Old Testament, speaking as they probably did in an impassioned manner, and with vehement gesticulation, as though possessed by a spirit which they could not resist, were looked upon as raving madmen. 'Wherefore came this mad fellow unto thee'? is asked of Jehu. And Shemaiah writes a letter declaring that the prophet Jeremiah is mad, and ought to be put in prison. (Jeremiah xxix. 26; Isaiah i. ix. 15.) Then, as sometimes now, it was true: 'Yea truth faileth; and he that departeth from evil is accounted mad.' Of Christ himself it was afterwards said: 'He is beside himself. He hath a devil and is mad,—why hear ye him'? To Paul, Festus exclaimed, 'Paul, thou art beside thyself; much learning doth make thee mad.' It is plain then that there has always been something in common recognized between the mental state of the inspired genius or prophet, and the mental state of the madman, whence it has come to pass that the terms mania and alienation of mind have been used to designate both states. There was an alienation of mind which was the result of divine inspiration, in which the mind was in an exalted state, and there was an alienation of mind which was the result of disease—a mania which was divine inspiration, and a mania which was properly madness or possession by an evil spirit. Possessed by a good spirit, the individual was a prophet; possessed by an evil spirit, he was a madman. Nor was it always easy to distinguish one state from the other, some of the prophets

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of the Old Testament, for example, presenting symptoms which can hardly be interpreted as other than the effects of madness; certainly, if they were not mad, they imitated very closely some of its most striking features. Jeremiah, under the influence of the prophetic spirit, procures a linen girdle and puts it round his loins. He then takes a long journey to the Euphrates to hide it there in the hole of a rock, returns, and again, after many days, takes another long journey to the same place to take the girdle again out of the hole, when he finds it had begun to get rotten, and to be good for nothing. Ezekiel takes a tile, and portrays upon it the city of Jerusalem; then he lays siege to this city on the tile, builds a fort against it, and casts a mount against it, and sets a camp against it, and battering rams against it round about it; then he takes an iron pan, and sets it for a wall of iron between himself and the city, and lays siege to the pan, as he has done to the tile; and for a long time he lies upon his left side before the tile, and then upon his right; he eats from time to time barley cakes which he had baked with cow's dung. The first command had been, 'Thou shalt bake it with dung that cometh out of man'; but, in consequence of his protest, it was said, 'Lo, I have given thee cow's dung for man's dung, and thou shalt prepare thy bread therewith.' On another occasion he removes his household goods in the twilight by digging a hole through the wall of his house with his own hand, and carrying away some of his furniture on his own shoulders in the sight of some of the Jews, who came to see the strange things he was doing. Isaiah loosed the sackcloth from his loins, put off his shoes from off his feet, stripped himself naked, and for a time walked naked and barefoot, under the influence of the prophetic spirit. Hosea declared that he was commanded to take a wife of whoredom; and accordingly did so." (Maudsley.)

We have to-day, in England, many prophets, but they have arrived too late to be appreciated. All we do for

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these poor fellows is to provide them with comfortable quarters where they may air their visions to congenial prophetic spirits! What queer tricks the whirligig of time plays! We bow reverently to the dictum of a prophet born a few thousand years ago. A prophet of to-day, we lock up in an asylum! The difference is not in the prophets; it is in the sane men.

Everything may grow from a religion based on impersonal verification; nothing, any longer, from one based on personal assumption. This is the age of reason; the age of emotionalism has passed, or is fast passing away. Enlightened men cannot now, however they may strive, believe what reason denies. Some may succeed in cajoling themselves into the idea that they do so believe; but, in their hearts, they know that this cajolery is the only result of their efforts: that idle acquiescence is really masquerading as belief. They are the dupes of established lines of brain-action: practically as much the creatures of instinct as the ostrich who is said to hide his head to conceal his body. Surely some other term than religion should be used to designate the self-delusion of such people!

Monopolies are proverbially hard to kill. There is one now desperately fighting to compel enlightened men to emulate the ostrich. Unless reason was put into mankind for no purpose, there can only be one end to this struggle: the end of the monopoly! Dogma must go! Whether superstition be embodied in a brazen image, or in the conception of a magnified man, the world has had enough of it.

Nature has now decided that, by reason, man shall cleave his way to Light! She is now evolving a religion which shall captivate man's reason as much as his "heart." When men really believe what they profess, they will have a true religion. Everything depends on honest belief. Take that away, and let us prostrate, kneel, mumble creeds,

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and sing psalms ever so persistently, our religion is but a ghastly exhibition of human folly and hypocrisy.

We talk of conscience as though it were an inexpressible entity, an afflatus always impelling us in a supernaturally ordained direction. In reality it is nothing but an established groove of sensibility impelling each of us, more or less, to conform to the experience gained by his forefathers. Whatever this conscience may direct us to, such object is, at the best, merely what the experience of our time and country recommends as most satisfactory to the collective selfishness; in other words, what is most expedient. As this expediency represents the drift of evolution, it naturally behoves every normally constituted man to follow his "conscience." This conscience tells the normally constituted man what is most compatible with the conditions of his existence, and he will naturally be predisposed to accept its persuasion; he will act conformably with his innate tendencies, and these being normal, with the interests of his fellow-men. If a man is abnormally constituted this conscience will lead him astray as to the conditions of his existence, and he will accordingly, sooner or later, suffer for his organic differentiation from the norm. To tell a man that he should follow his conscience, is to tell him either a truism or a fallacy, according to the character of his conformation. If Nature will permit, every man will have a normal conscience and will follow it. But, Nature does not always permit; men are often endowed with the birthright of abnormality! We thus see that it is advisable to follow a normal conscience, because, by so doing, we best conform to the conditions of our existence. We further see that, as a normal conscience is inseparable from a normal organism, Nature deprives some men of this guiding light to expediency.

Our conventional spiritual notions spring from the

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same source as "conscience." They are entirely the result of practice in a special mode of thinking and are now crystallized, in the shape of Dogma, into a product which men accept without thinking. Herein conventional religion differs from conscience: that the latter has kept pace with the drift of evolution, growing with the race, while the former is a respectable fossil which civilization is about to deposit in its museum of antique curiosities! Conscience is the echo of expediency; dogmatic religion, of inexpediency. While humanity follow expediency, men will follow conscience, and, in doing so, find that "distance lends enchantment to the view" of their precious relique!

Any of us alive half a century hence, will probably have ample food for reflection in the radical change in mankind's views of expediency from those of to-day. Such observer will note, among other changes, that the "free-will" conception, with all its ensuing deductions, is dead as the friends of his youth. In those days mankind will not even trust the "free-will" of the philanthropist, who will be cynically despoiled of his occupation! Then "good" men like, say, the late Mr. Smith, M.P., who, while playing the game of life, have amassed their million, will be compelled to personally disgorge, or society will help itself when they and their millions part company. The philanthropy of those days will be the selfishness of the majority, which will probably prove a more reliable benefactor than was the older fashioned one, even with his "free-will" thrown in as makeweight! Nature, as we have already remarked, will have men unequal—intellectually, physically, and morally. Without opposing Nature's decree, by trying to render men equal, society will discover a method of relieving "good" men of the temptation to indulge a hyper-philanthropic nature. Unlike most other carnal sensibilities, this philanthropy has a great tendency to become isolated in an infinitesimal part of mankind; and further, unlike many sensibilities,

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it is one which could not do very much harm were it universal. Society is going to try to remedy this state of affairs. It is going to assume the burden of each individual's potential philanthropy, and is going to credit many with a far larger share of that potentiality than they possess!

Man, individually, will become adapted to this transfer of potential philanthropy, otherwise amiable selfishness, to the unamiable selfishness of society. Many, however, it is to be feared, will at first accept with ill-grace the compliment of society in taking for granted their amiable selfishness; they will feel they do not deserve the imputation, yet will be powerless to repudiate it. But, to the really "good" man, it will soon appear as inexpedient to leave a million to the tender mercies of his heirs and executors—and society—as to vow he would like to cut a few throats, or, if he is a "society"-man, as to tell his hostess he is ravenous for dinner!

CHAPTER V.

THE reader will now have a faint idea of what Science has revealed respecting the genesis of cerebral impressions.

If "will" is to be included among the ordinary nerve-impressions for which Science has accounted, it must be subject to the same conditions of manifestation. The force-current must have affected the cerebral fibres and cells before there can be a manifestation of "will" as much as before there can be a manifestation of sight, hunger, or any other sensation or state. In other words, we have begun to be hungry, to see, and to "will," before we have physical consciousness of the fact.

Let us now, for a moment, assume that will is a faculty separate from every other. We must assume it, under

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these circumstances, an elixir apart from the body and often opposed to all the physical faculties and tendencies. We cannot conceive physical consciousness of the action of such a free agent as being simultaneous with the action itself. However infinitesimal, there must be some lapse of time between the action and consciousness. We can only measure human responsibility by physical consciousness of action. We must accordingly infer no responsibility for the action of such a free agent. Then what would be its office?

Let us now compare what emotion has, for centuries, taught us to accept, with what Science enables us reasonably to believe. We cannot, for such a purpose, do better than instance the views of representative men. Let us compare the views of Dr. Moorhouse, Bishop of Manchester, with those of Mr. J. F. Nisbet. Both men are representative of the brain-power which guides popular thought; they are at opposite poles of intellectual method, and are, doubtless, honest searchers for truth.

Mr. Nisbet, in his notable book, "The Insanity of Genius," remarks:—"Discrimination is but another word for consciousness, a necessary element in this being a change from one nerve-state to another. If we could conceive the weather-cock as being endowed with a discriminating faculty, we should perceive that whatever might be its belief in the voluntary nature of the movements it was executing, these movements would in every case have been entered upon before it began to discriminate them. This is precisely what happens in the case of our so-called volitions. They are begun before they come within the sphere of consciousness at all. . . . If it be admitted that what men call mind is only the working of a sensitive mechanism called the brain, which is acted upon by stimuli from the outer world through the senses pretty much as a weather-cock is acted upon by the wind, it follows that in speaking of the will as an agent in our mental processes, we mistake

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a word for a thing . . . man is moved hither and thither by external influences acting upon an organization with which he has been endowed at birth, or rather at conception. . . . He is required, as he thinks, to make up his mind as to which way he will go. The forces acting upon him are numerous and subtle, some obvious and material, others purely ideal, many hereditary and unconscious. There is a multiplicity of motives counteracting and reacting upon each other in the various centres of his brain. To all, he is more or less responsive, just as the memories or experiences or hereditary predispositions concerned in the conflict, are strong or weak. In the end, one impulse or set of impulses proves itself the stronger, and he is carried along by it. Meanwhile, he flatters himself that he has made an effort of will in this direction! In reality he has been as passive as a musical instrument that is played upon. He thinks he commands, whereas he only obeys."

Now we will take a quotation from Dr. Moorhouse's book, "Dangers of the Apostolic Age":—

"The passions which drive us are instinctive. The conscience which directs us is intuitive. . . . We are born with these endowments, and we cannot enlarge or alter them. . . . We see and feel and do that which, through them, God determines that we shall see and feel and do."

So far Science has no important disagreement with the Bishop's statements, except to demur to his distinction between intuitive and instinctive in respect to "passion" and "conscience." Whatever names we give them, these are merely special forms of brain-action. Soon, however, the Bishop soars away from reason into the realms of pure emotion. "But, beyond these faculties there is another, full of Divine might and mystery. . . . We have a will which is miraculously, supernaturally free. The Divine thought and will which absolutely determine instinctive life, so far limit their interference in the human soul as to leave a really directive originating activity to our will. . . .

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It is blasphemy against the divinest property in man to say that he is the mere creature of his environment."

What a magnificent assumption is this; that finite intelligence has ascertained the point at which the Infinite has left it free to its own devices; beyond which the creature is responsible for its own existence!

According to our mental idiosyncrasy we may accept or reject this theory; but mark! only so long as Science is silent. When Science has falsified emotion, we must perforce discard the latter. When Science tells us that only *after* the cerebral nerve-cells and fibres have been excited to activity is any feeling, impulse, desire—in a word, consciousness—possible to man, what becomes of this castle of the imagination?

Let us suppose the Bishop as of another mental type, are we to assume that the exercise of his "free-will" would be unaffected by the physical change in brain-structure? Science says it would be childish to form any such assumption. She tells us that under changed cerebral development the human resultant might quite conceivably have been a criminal instead of a bishop.

To state that personalities would, under these circumstances, be changed, is merely to shift the difficulty. If "free-will" is really what the Bishop defines it—a supernatural attribute with absolute power to determine the creature's course, such attribute must be consistent with itself—its activity, under any circumstances, must be constant in tendency. Such a "will" cannot "blow hot or cold" according to mere physical accident. To assert that, in one person, it acts one way, but if transferred to another person, would act quite differently, is merely to assert that it is the slave of organism. We must either assume that this "will," under all circumstances, preserves its integrity, or we must deny that it is "miraculously, supernaturally free." If the Bishop means to assert that such invariability, under any physical change, is the property of

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this "will," then science, experience, and reason emphatically declare that he might as well assert the moon is made of green cheese! This is plain, unexaggerated fact; there is as much evidence for this green-cheese moon as for such a "will." Indeed, were records existing that certain "inspired" persons—in the only times of genuine "inspiration," when Church fathers were manufacturing definitions—had actually tasted this moon and found it really green cheese, the evidence in that direction, to certain minds, would be infinitely stronger than for the Bishop's "free-will"!

Which shall we accept—the verdict of Science, whose only object is Truth, or the hypothesis of theologians whose personal pretensions depend on this hypothesis? Would any rational man hesitate which to trust in the ordinary affairs of life? Why should he hesitate in a matter of infinitely greater importance to himself and humanity? Depend upon this: now it is revealed, this truth is destined to modify coming generations—perhaps this. There is a big *rôle* for it to play in the game of evolution. It is here to time; it is here to stay! Can the Bishop instance a single case in which mental affliction has not materially affected this "free-will"? Has he ever heard of an insane person whose "will" has remained intact? Surely, whatever became of the mere mind, this supernatural agent should persevere in its self-appointed course! We cannot understand, say, a half-century old, consistently well-conducted "will," suddenly turning into a disreputable trouble to its owner, merely because his brain had lost its balance. No, no, my lord! this "free-will" of yours bears all the distinguishing marks of an arrant impostor. It is no more independent of a man's body than is his nose! We know that every case of mental disease involves a corresponding change of "will"-power; that normally virtuous people, through such disease, lapse into the grossest viciousness; that sane "will"-power vanishes with sane intellect. Here are typical cases:—

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"Dr. Pownall, a medical practitioner, was admitted into the private asylum of Northwoods, under the care of Dr. Davey, on April 12th, 1859. He was described in the medical certificate, which was dated on the same day, as having made a murderous attack on his mother-in-law, whom he usually respected and loved. For the last three months he had become an altered man, had been low and desponding, and had made an attempt to destroy himself. This was the third attack. . . . Between the attacks he had conducted successfully a large medical practice, and had been so much respected by his fellow-townsmen as to have been chosen mayor of the town. He was described as being naturally an amiable and estimable man, but, when insane, as violent and dangerous to himself and others." (Maudsley.)

"Wigan tells of a gentleman who, by dint of long and exemplary services, rose to a position of great importance, in which he exercised a paternal control over his subordinates, and was much respected by all who knew him. Gradually, towards the age of sixty, this gentleman became garrulous and light in his conversation, and the others in his office suspected him of drinking. He had many rebuffs from the persons under his command, but this in no degree changed the indecorous levity of his conversation, which had formerly been remarkably dignified and as reserved as was compatible with his excessive benevolence of disposition. Months passed on; his language became gradually worse, and, despite repeated warnings from his employers, he sank at last into the most depraved obscenity, which led to his dismissal. Not long afterwards he died of brain disease." (Nisbet.)

Such cases are within the common experience of medical men. Do not they show that, by no process approved by reason, can we argue to a separation between intellect and "will": that we stultify our understanding by accepting

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the theory of a "will which is miraculously, supernaturally free," yet which allows the mere accident of physical degeneration to affect its essence? Remember that every process of scientific induction confirms the lesson of the above instances of moral, coincident with physical, change: that, by every scientific method of examination we are led to the conclusion that "will" has no existence apart from brain, and that brain is an automatic mechanism governed by influences issuing from the Inscrutable Cause behind the universe.

The fundamental error from which Metaphysics argues to "free-will" is that consciousness represents reality. Thus, Metaphysics argues: I have an inner sense of freedom, therefore, I am free. As well may she argue: I have an inner sense that light is white, therefore it is white. Or, as well may the fly argue: I have an inner sense of turning this wheel, therefore I am turning it. Metaphysics applies this method in all her difficulties. By it she verifies her deity, and her "good" and "evil," confidently assuming that the way in which consciousness causes her to animalize certain indeterminate issues, must be the true solution. Because she can only realize an anthropomorphic deity, therefore the Power behind the universe must be anthropomorphic; because she can only realize "good" and "evil" as the observance and breach of certain standards of behaviour, therefore these constitute the real good and evil. Now, Science will not countenance this method. She says that consciousness is an utterly unreliable demonstrator of reality. Metaphysics retorts: the ultimate truths of Science may be as far from reality as are my truths. Granted, they *may* be; nevertheless, they enable men to account for and determine facts, in a way satisfactory to reason and experience, and often before such facts have become apparent to the senses. Thus, by applying her methods, Science localized, long before it was seen, the

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planet Neptune. This astonishing triumph alone, is a finer demonstration of reliability than the whole range of metaphysical achievement can show.

There can be no amalgamation of Science with the Metaphysics of Dogma. Scientific workers, such as Wundt and Ribot, have attempted to reconcile the metaphysical "free-will" with scientific psychology, but the attempt is hopeless, and merely serves to show how habit of thought may blind the most powerful intellect to the inevitable issue of its own achievement. Thus, we find Ribot, Wundt, Bain and Bastian unable to emancipate themselves from thraldom. They demolish "free-will," yet hesitate to pronounce man the creature of his organism. However, since the works of these writers were published, the researches of Weismann must have shattered, even for the above investigators, the last tie between Metaphysics and Science. Really, there is now no more reason to apply the method of Metaphysics to the subject of mind than to that of electricity. We may say that the possibilities of the machinery of mind are now as well understood as are those of the machinery of electricity, and that the force behind one is no more mysterious than that behind the other. In fact, we may as well try to argue to "free-will" in the voltaic pile as in the brain. The only reason why this has not been earlier realized is that men have hitherto, in respect to this question, been trying to accommodate fact to theory, instead of the reverse; they have been hypnotized by the *à priori* method of Metaphysics.

Even Science has, on this point, been so saturated with precedent and overawed by antique delusion as to emulate the mischievous schoolboy who appears deferential to the pedagogue on whose back he has just chalked: old fool! Here we find Mr. Herbert Spencer, the most scientific and profound thinker of the age, demonstrating, by the most cogent evidence, and emphasizing by the most positive assertions that Dogma's deity is a puerile concoction of the

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imagination, yet, at the same time professing a lurking regard for what he has just spurned, because mankind are supposed to need its fantastic terrors to impress them with the importance of morality. First to demolish every vestige of reason for entertaining a conception, then to maintain that this conception is a vital necessity for humanity, seems contrary to logical procedure. It shows clearly that the greatest powers of intellectual abstraction may be manifested concurrently with an inexplicable subjection to the commonplace of environment. How Mr. Spencer reconciles the earlier chapters with the last, in Part I. of his "First Principles," seems an enigma beyond the powers of average brains. We have too great admiration for Mr. Spencer's demolition, not to perceive the incongruity of its company. After reading his synthetical and analytical pulverization of Dogma, we are prompted to exclaim: Alas! that the arch-apostle of Truth should have bolstered Sham, by writing some parts of "The Reconciliation."

Again, read the following remarks and ask yourself how their logic would apply to any subjective conclusion other than the doctrine of "free-will." "Yet that every higher Intellectual and Moral Process, just as much as every lower Sensorial or Perceptive Process—involves the activity of certain related cell-and-fibre networks in the Cerebral Cortex, and is absolutely dependent upon the functional activity of such networks, the writer firmly believes. He, however, as decidedly rejects the notion which some would associate with such a doctrine, viz. the supposition that Human Beings are mere 'Conscious Automata.'" (Bastian.)

To the best of the writer's comprehension, the only alternative available here, to "conscious automata," is "free agents." Apparently, Mr. Bastian, supposes we are agents with limited freedom; however, in place of showing us to what extent and by what means our freedom is limited, he shows us how it is destroyed!

"Consciousness or Feeling must be a phenomenon having

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a natural origin, or else it must be a non-natural, non-material entity. For reasons which have been set forth in various parts of the present volume the writer adopts the former of these views. It is commonly believed that 'living matter' has now, or has had in past times, a natural origin; Nerve Tissues also have a natural origin in or from elemental forms of 'living matter;' and if Conscious States or Feelings are admitted to be an appanage only of Nerve Actions, so also (as far as we can ascertain) does their mode of appearance, their increase in intensity, their modifiability by agents modifying the nerve-tissues, and the limitation by which they occur only in association with certain nerve-actions taking place in the higher and most complex of an animal's Nerve Centres, harmonize with the notion that they are in some way an actual outcome of such Nerve Actions, no more capable of being dissevered from the physical conditions on which they depend, than is Heat to be dissevered from its physical conditions. To say that heat is a 'mode of motion,' takes for granted the underlying fact that it cannot have motion except through a something which moves. Heat has no abstract and isolated existence as an entity. Consciousness also is a result of a something which moves. But just as it is the very material motions on which Heat depends which do the work ascribed to Heat, so do the very material motions on which Consciousness or Feeling depends, do the work we ascribe to Feeling. . . Hence it is that States of Feeling may, in very truth, and in accordance with popular belief re-act upon Nerve-Tissues so as to alter the molecular motions taking place therein. Feelings, whether purely personal or of the moral order, thus have, as they seem to have, an indubitable effect in modifying our Intellectual Operations, our Volitions, or our Movements." (Bastian.)

As these "feelings" are by Mr. Bastian's showing, clearly beyond the control of any conceivable "ego," inasmuch as they are the products of certain independent

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motions, they are tantamount to the resultant of our assumed nerve-force, and are therefore incompatible with any assumption except the one which Mr. Bastian affects to reject: "that human beings are mere conscious automata." Again, as these "feelings," according to Mr. Bastian, modify "our intellectual operations, our volitions," and "our movements," they modify every conceivable form of human activity, and are consequently the determining factors which control human existence.

Moral: we cannot coquet with "free-will"; we must either grant, or deny it, *absolutely*.

"Whoever hesitates to utter that which he thinks the highest truth, lest it should be too much in advance of the time, may reassure himself by looking at his acts from an impersonal point of view. Let him duly realize the fact that opinion is the agency through which character adapts external arrangements to itself—that his opinion rightly forms part of this agency—is a unit of force, constituting, with other such units, the general power which works out social changes, and he will perceive that he may properly give full utterance to his innermost conviction: leaving it to produce what effect it may. It is not for nothing that he has in him these sympathies with some principles and repugnance to others. He, with all his capacities, and aspirations, and beliefs, is not an accident, but a product of the time. He must remember that while he is a descendant of the past, he is a parent of the future; and that his thoughts are as children born to him, which he may not carelessly let die. He, like every other man, may properly consider himself as one of the myriad agencies through whom works the Unknown Cause; and when the Unknown Cause produces in him a certain belief, he is thereby authorized to profess and act out that belief. . . . Not as adventitious, therefore, will the wise man regard the faith which is in him. The highest truth he sees he will fearlessly utter; knowing that, let what may come of it, he is thus

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playing his right part in the world, knowing that if he can effect the change he aims at, well; if not, well also, though not *so* well." (Spencer.)

If wise men in these days carry into practice these sentiments, and publishers promulgate broadcast the latest convictions of the most advanced thinkers, it is evident that all attempts to temporize with antique delusion must be futile. Men will read and interpret facts with too great perspicacity to suffer terrorism by any influence which those facts have demolished. It is a pure waste of effort, and a self-stultification, for any writer to publish his convictions, telling mankind, nevertheless, that, like coronets, these convictions are only to be used by the elect. Depend upon this: there are few men of this generation who take the trouble to read such work as that by which Mr. Spencer has enriched the world, who are not quite able to see through Mr. Spencer's amiable solicitude in recommending a less stimulating mental diet than he provides. Such men will say that the only method of giving effect to this solicitude would have been to keep the diet out of the reach of humanity. Truth, though it be merely relative, needs no apology, and deserves no half-hearted promulgation. If men need fear to restrain them, the gallows and penal servitude are available, and far more efficacious as a terror than Dogma's bogle.

There can be no reconciliation between dogmatic and scientific religion, because we must take away all the dogma to render religion scientific, and all the science to render it dogmatic. The moment we rob religion of definitions, it ceases to be dogmatic; the moment we concede them, it ceases to be scientific. There can be no dogmatic hybrid to suit Science, and no scientific hybrid to suit Dogma; but there may perhaps occur an insensible merging of differences, proceeding, as at present, by Dogma's renunciation, one by one, of her definitions, until she has none left to renounce.

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CHAPTER VI.

We will try to illustrate the genesis of "voluntary" action. I feel a shock from a blow administered by an angry man. This shock, before it becomes conscious sensation, reacts on the reminiscent cerebral areas, arousing there a new set of vibrations. These primary and secondary vibrations then proceed to the sensorium. The reminiscent vibrations vividly reproduce the impression of a benefit received by me from the giver of the blow. This impression produces in the sensorium its original effect—a feeling of gratitude towards my former friend. Possibly, on receiving the blow, various other sharp vibrations of a sensual character tending to induce retaliation on my part, may have been excited by the sensation of pain. These, we will assume, are too weak to prevail against the reminiscence, which vibration dominates my action. The resultant is discharged into the motor areas by which "will" is manifested. I walk away without retaliating.

The striker of the blow, similarly thrilled by various vibrations, finds one predominating—the reminiscence of our former friendship. This reminiscent vibration, every moment becoming stronger, at last dominates the position, and is discharged into the motor areas. He hurries after me, and asks my pardon. Contending vibrations again arise in my brain. At last one prevails. I grasp his hand. We are friends again.

Now, all these so-called voluntary actions originate from, and are absolutely dependent on, automatic sensibility. According to the structure of his brain, each of us has experienced his special primary and secondary vibrations. If these had been differently aroused, a different resultant would have issued from the sensorium into the motor areas. I might have displayed cowardice, pugnacity, or magnanimity, but, simply as the effect of the predominance of

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this or that reminiscence over purely sensual vibration. In neither me nor the striker was there any "ego" to determine which vibration should predominate, or whether any vibration should occur. Each so-called volitional act was merely the effective energy of the, for the moment, predominating reminiscent vibration aroused by the original excitant.

Now let us take another case, illustrating what we commonly consider the triumph of good over evil by means of the "will."

A penniless, hungry man notices a person drop a sovereign and pass along. The finder follows and restores the money. Let us assume that this is done without any hope of reward, from a purely virtuous motive. What accounts for this action? Most will reply: the pauper's will overcoming his desire. That is fallacy. The pauper follows his desire, as fully as if he had appropriated the coin. "Will" is here, as everywhere else, a mythical assumption.

Let us suppose that the pauper's first impulse was to pocket the coin. That was one sensorial impression. Then arises a reminiscent impression telling him to reject the earlier impulse. The reminiscence predominates. Here, as in every other case of human action, that action purely depends on automatic cerebration. This pauper's "collodion-plate" enabled him to manifest in action, what teaching had impressed on his sensibility, viz. that social expediency requires a man to respect the rights of property. The pauper simply prefers a "moral" to a sensual gratification. But, he does not "will" to prefer it; organism decides his selection. His cerebral sensibility has been receptive of the moral notions of his time, and he has been the obedient servant of that sensibility. Had these moral notions not impressed on his sensibility that it was inexpedient to steal, he would have differently responded to the temptation. The paramount necessity of neglecting no means of impressing the human brain with the importance of moral expediency, and of maintaining at all hazards that expediency, is the

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lesson of the case of the honest pauper. We must afford each individual the fullest opportunity of developing his innate tendency towards the drift of social evolution.

Assuming the undoubted truth that nervous vibration is the cause of all cerebral action, this vibration must occur, either subject to law or free. We will assume the absurdity that this vibration is free: a vibrating "ego." But as each nerve-fibre has its special vibration, this involves the supposition of a multitude of free agents contending in the human organism. Are we any nearer the "ego" of Dogma, if we concede these absurdities? Are we not, with all these contending "ego"-fibres, in identically the position, with respect to personality, of assuming merely the natural fibres? How could we fix responsibility for the action of all those contending free fibres? Again, if we have a single "ego" opposing a multitude of law-bound vibrations, are we any better able to fix human responsibility?

Let us assume this single "ego": let us suppose that it could, in some mysterious manner, interfere with the sequences of cause and effect in the organism—how could it affect the individual's responsibility? He cannot modify his own organism. This, Dogma herself cannot, in the face of recent research, deny. Then if organism proved stronger than "free-will," how could the individual be held responsible for the strength of his organism? Or, if "free-will" prevailed over organism, how could he merit reward for the comparative weakness of the latter?

Now let us assume the non-existence of "free-will." Without it, Science is quite able to account for all the actions and thoughts of humanity. As the machinery which produces all the effects hitherto ascribed to "free-will" is as apparent to reason as is the machinery producing the effect of circulation of the blood, we do not need "free-will" to account for anything. Absolutely the only practical reason for retaining the conception is to place on it the superstructure of supernatural penalties. But, all, and more than all, the effect of these is achieved by human

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penalties. Depend upon this: the man who, nowadays, requires the restraint of prospective punishment, if he can escape man's devices, will laugh at those of Dogma. The agent which restrains the "unfit" member of society, if he is to be restrained, is, not the terrors of mysticism, but the prosaic prospect of penal servitude! Nothing, in these times, is sacred from the scrutiny of commonsense. The most advanced thoughts, the latest scientific discoveries, are the property of the masses almost as soon as of the *élite*. It is now idle to expect sentiment to strike terror when fact excites ridicule. Men are now only capable of believing what reason tells them to believe. This is the effect of evolution on the cerebral type; no human power can modify this effect. In past times of superstition, men could believe without the help of reason; what is called the modern deadness of religious fervour, is nothing but the proof that another cerebral type is evolved. Scepticism, formerly of the few, is now of the many. However he may try, man cannot longer stultify reason. All the so-called belief of to-day, not based on reason, is pitiful sham, and sham known to every man professing it who will fearlessly analyse his pretended convictions. Even from the point of view of those who promulgate it, "free-will" is an utterly useless doctrine. It is worthless if it fix human responsibility, and curb society. It does neither one nor the other. Whatever good there was in it, is dead with the past. It is utterly discredited by fact and expediency, and must now be relegated to that category of exploded myths where repose "everlasting Hell-fire" and other cognate scintillations of morbid imagination, now discarded even by Dogma herself, yet once held with all the tenacity which she now evinces for the retention of "free-will." Read any old divine; mark his certainty with respect to "Everlasting Hell-fire." Note how fiercely he gloats over the eternal torments in store for erring humanity. Then read what the Bishop of Manchester has to say about this wretched figment of jaundiced brains.

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Here is the sort of stuff on which is based the conventional "Hell-fire" doctrine:—The most philosophical (!) of Christian Fathers, Augustine, argues that human beings will last for ever in burning flames. One confirmation of this proposition is the nature of the salamander and the supposed antiseptic nature of the peacock! Augustine argues that a God who could perform the miracle of creation could easily cause dead bodies to rise and be susceptible of everlasting torment in Hell-fire, the temperature of which will be nicely graduated to the particular offences of each sinner! Minucius Felix, another light to humanity, says: "The intelligent fire burns limbs and restores them; feeds them and nourishes them." Another, Cyprian, considers that believers must have a sanctified gratification in knowing that at the Day of Judgment, "an ever-burning Gehenna will burn up the condemned, nor will there be any source, whence, at any time, they may have either respite or end to their torments. Souls with their bodies will be reserved in infinite tortures." There is no need to quote more of such rubbish. Only let it be borne in mind that on similar rubbish has Dogma based her pretensions to expound what she designates the only doctrines vital to humanity; that solely the "Time-spirit" has forced men like the Bishop of Manchester to realize the repulsive imbecility of the testimony of those whom they nevertheless accept as adequate authority for the doctrine they promulgate. Well may the author of a recently published book, "Paganism and Christianity," write: "When we think of the millions upon millions of our race for whom the joys of life have been embittered, and the physical pains of whose last hours or years have been intensified a thousandfold by the prospect of those coming torments which they were led to regard as the just merits of their sins, at the hands of a God as loving as He was omnipotent, we shall better appreciate that degradation from its original purity which Christianity underwent at the hands of the Church Fathers, who threw philosophy and commonsense to the

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winds, to revel in conceptions as impious as they were coarse; and when we compare their teaching on that point with the beauty and simplicity of the Religion of Philosophy, the religion of Seneca and Cicero, which, irrespective of any certain reward or retribution beyond the grave, could yet teach men to live each day as if their last, and could bid all men to depart from life with equanimity, assured that death either put an end to all evil or was the portal to a happier state, we shall be inclined to call in question the commonly received opinion that Christianity added perceptibly to the happiness or mental progress of the human race, and we shall be tempted to wish either to liberate that religion from the deadly stain of its superstitious accretion, or to restate and re-assert the claims of human reason as they were stated and asserted by Philosophy more than two thousand years ago." (J. A. Farrer.)

When we consider the devastation, massacre, torture, and other dastardly wrongs which have been perpetrated in the cause of religious emotion, we may well hesitate before asserting that such emotion has done less harm to mankind than has their deliberate villainy; that, if such natural villainy had been unopposed by religion, mankind would have been in any worse state than now; that, the restraining influence of dogmatic faith has not been absurdly overrated as a factor in advancing humanity. There can be no question that human nature is exactly as it would have been had dogmatic religion never existed; the only open question is whether the outward manifestation of such nature has been appreciably affected. Whatever the effect may have been in earlier times, we may confidently assert that now it is spent, that Dogma has served the purpose of her existence and must depart.

In these days the conviction felt by a well-organized man that the Immanent has willed him a good specimen of Nature's handiwork, is at least as calculated to induce him to try to conform to the recognized expediency as is any form of terrorism which Dogma can apply. Such a man's

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fears cannot now be excited by Dogma. He laughs at her threats. He knows that no just tribunal could exact such a penalty as Dogma pronounces. He has read what Criticism and Science have discovered. He feels a stronger inclination to kick than submit to the pretender who maunders about the infinite mercy and love of a supernatural judge, while demonstrating that judge to be filled with implacable vindictiveness. He sees nothing admirable in those "believers" whose restraint from ill-doing is the terrorism of Dogma. Neither fearing punishment nor claiming exceptional reward, this "fit" specimen of manhood elects to go his way unaccompanied by Dogma.

But, it may be asked: What about the "unfit" man—is not *he* restrained by Dogma's terrorism? The reply is, that he is less affected by it than is the "fit" member of society; that the only deterrent really influencing the victim of Nature's inconsistency is the prospect of punishment by society, and that even such prospect, as often as not, fails to achieve its object.

Of course, Dogma professes to hold out a higher inducement to virtue than is any system of punishment for wickedness. This supposed higher inducement is a system of rewards. The writer denies that the offer of a reward is any higher stimulus than is a threat of punishment. He asserts that both are essentially appeals to the sordid element in human nature. He, however, grants that, in a few very exceptional cases, there may be some sort of nobility in aiming at a high ideal even for the consideration of a reward. Nevertheless, he unhesitatingly asserts that, in the great majority of cases, constituting practically all humanity, there is no such nobility; that the inducement resolves itself into an appeal to the same selfishness which the threat tries to influence, and that the threat is, after all, the great machine by which Dogma has maintained her pretensions.

The whole record of sacerdotalism proves that it mainly owes its existence to terrorism over the human mind; that

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the early churches were consolidated through a vulgar superstition that the end of the world was at hand, and that only through conforming to the formularies of such churches, could mankind hope to avert the terrors of Judgment Day. Origen, for example, tells us that converts treated with contempt every kind of torture and even death, through fear of "everlasting punishments;" that it was not the very wicked, but people of average morality, who were influenced by such superstition. Tertullian, the great Christian apologist, glories in the approaching Judgment Day, when he shall behold his enemies writhing in flames.

We might fill a volume with quotations showing that this "everlasting punishment" did more to uphold sacerdotalism than all its other tenets. In these days even, to the masses, it is the prime foundation of the ecclesiastical edifice. Only lately have a few liberal-minded churchmen like the Bishop of Manchester, openly disavowed it; still, a great majority of the clergy, whatever they think privately, take care, in public, to make good use of this old superstition.

However, all such deviations from the strictly literal "everlasting fire" conception, as the Bishop of Manchester now propounds, and as were propounded even by such early Christians as Origen and John Erigena, merely show the shifts to which rational churchmen were and are driven to accommodate their doctrine to their reason. There is no room for doubt that real and material everlasting fire was the essential belief of historical Christianity, and that all attempts at palliation by figurative constructions are really heretical departures from the original faith, which itself was a derivation from pre-Christian Paganism.

Evolution works as actively in forming religions as in forming organisms. The process may be as clearly traced in every specific doctrine as in every specific organism. No religion, no organism, was created isolatedly perfect and final. All religions, all organisms have their roots in

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the immeasurably distant past, and have, respectively, one original progenitor. The genealogy of religions is a chain of subjective conclusions always liable to revision by impersonal evidence; the genealogy of organisms is a chain of types ever varying through the drift of evolution. Nothing is final and perfect in the universe—not even the latest verification of Dogma!

Impersonal evidence has compelled the Bishop of Manchester to repudiate "Everlasting Hell-fire;" so will it probably compel him, if he lives as long as the writer hopes he may, to repudiate "free-will"! It may gratify the innate vanity of many to consider man a free agent. Fact proves him the creature of organism. Humanity will prefer fact to sentiment. The most confirmed egotist will soon reconcile himself to the scientific verification that, whether genius or dolt, whether saint or sinner, there is no *ego* to merit praise or condemnation for the "good" or "evil" of his existence; that the resultant of his earthly career was decided before he entered the world. Such a doctrine, all must own, has the recommendation of inculcating modesty. We must all realize that it drives us to minimize our own pretensions, by showing us that, outside the narrow sphere of our workaday world, there is little to choose between one man and another!

Twenty years ago the case was apparently different. Then, there appeared some plausible reason why a man should puff himself out with the virtues of his conformation. "Free-will" had not then entered the crucible of scientific scrutiny. A man might then have reasonably taken some unction to himself for his honest prosperity, or his elevated character. Now, he has no more real reason, on such account, to pat himself on the back, or expect others to do so, than for the reason that he has a good digestion. The honest genius is generally of value to his fellow men; the vicious ne'er-do-well is worse than useless; nevertheless, the former is entitled to no credit because he is the genius and the other the vagabond.

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Of course such truth as this will not be readily assimilated by many—vanity is deep down in human nature—but soon all must realize the inevitable conclusion to which Science drives us: that everything which constitutes man is the product of evolution under eternally rigid Law; that this Law irrevocably determines all the "good" and "evil" of each individual.

Does not the Religion of Science tend more to open "the bowels of compassion" than all the metaphysical shibboleths invented by the brains of men? Does not the term, "erring brother," derive augmented significance from the fact that man is the creature, not the master of his conformation? May we not reasonably hope for some approach to universal brotherhood as the issue of a faith which tells each of us he ultimately stands or falls by the same destiny as his fellow? When the real nature of thought is a matter of common knowledge, only fools will consider themselves elect, and only the innately callous will fail to discern the kinship of a humanity linked together by one awe-inspiring bond of mystery, only, if ever, to be cleared away by death.

With this new truth driven home to the convictions of mankind, Dogma will have received her quietus. She knows this, and will make a valiant fight for "free-will"—but, too late! Though she denounce humanity for "Averroism," "Materialism," "Atheism"—all the "isms" in her dictionary—"free-will" is already dead as the Dodo. Fact has despatched it. Humanity is about to bury it.

In the same way as she has, by fanciful interpretation, tried to render the ancient conception of "Everlasting Hell-fire" assimilable by modern intelligences, Dogma has tried to render acceptable the orthodox conceptions of an originally perfect man and a six-days' creation. We have already exposed the absurdity of two of these assumptions; we will now devote a few lines to the consideration of the six-days' creation.

There can be no doubt that Dogma, as distinctly as she

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has propounded anything, has asserted that, in six days, the Lord made heaven and earth and all that is in them; and that Dogma meant a strictly literal interpretation of these six days. Now Science has long ago placed beyond question the fact that the formation of the universe must have occupied millions of ages; that it is still progressing, as it has always progressed, by the evolution of new, from pre-existent, types; that such a term as "creation," applied in the sense of a sudden production, is utterly misleading; that evolution is the proper term to apply to the method of creative Energy. Everything has grown from something else; there is no such quality as absolute fixity in anything existing or that has existed. Geology, palæontology, and astronomy clearly show that there has been an unbroken chain of organic and inorganic evolution energizing from the very beginning of all things to our own times. We have evidence that all celestial bodies, including our earth, were originally masses of vapour in intense molecular disturbance; that after the lapse of millions of years, such masses condensed into nebulæ, or masses of meteorites; that, through increasing contraction and the consequently greater violence of their reciprocal collisions, these masses of meteorites became hotter and brighter until they were stars, of which the sun is, and the earth was once, one; that all these stars are radiating away their heat, and will become, as some have already become, cold bodies like planets. Our earth, which Dogma once "infallibly" decreed to be the centre of the universe, proves to be the merest speck in comparison with the sun, which itself is the merest speck in comparison with many other stars. To give an idea of the insignificance of the earth in comparison with the sun, we may state that the latter is 1,305,000 times larger than the former. To give an idea of the immensity of that space, which Dogma once "infallibly" decreed to be bounded by the atmosphere, a few miles above our heads, we may state that "the nearest fixed star is more than 25,000,000,000,000 miles

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away; the more distant ones so far away that light, which travels at the rate of 186,300 miles in a second of time, requires thousands of years to dart from the stars to our eyes." (Lockyer.)

Nothing gives us so vivid an impression of the parochial narrowness of mind and the inexpressibly dense ignorance on which have been erected all dogmatic conceptions, as the facts which the telescope, spectroscope, and microscope enable us to apprehend. Nothing exposes so effectually the ludicrous pretentiousness of Dogma, as a general acquaintance with scientific verification.

Such figures as the above, though they baffle our attempts to grasp their full significance, are not haphazard guess-work. They have been verified by the minutest scrutiny, the most exact and elaborate methods. Astronomy calculates the distances and bulks of objects millions of miles away, as reliably as the bank-clerk weighs coin or the surveyor measures a field. Again, Science deals with such a multiplicity of subjects, all bound together by interacting laws, that she is able to test her conclusions by the most rigid system of checks: if she deduces falsely in one line of research, others are sure to expose the fallacy. Hence, what Science pronounces decisively may be safely assumed absolutely true.

Now, let us glance at the geological aspect of the question of a six-days' creation. How long the earth took to cool sufficiently to allow the existence of organic life, must be reckoned by millions of years; how long organisms existed before man appeared must be reckoned by similar lapses of time; how long man has existed must be measured by hundreds of thousands of years. We have evidence leading us to suppose that the common ancestor of man and the anthropoid ape existed in the Upper Miocene period: that of the latest but one of the twelve great fossiliferous strata into which the earth's crust has been divided. The period when man himself first branched

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off from this common ancestor has not been determined—at anyrate its antiquity would dwarf into insignificance the Mosaic chronology of the creation of the whole universe—but we have clear proof of his existence in Europe towards the end of the glacial epoch, and there are many indications of his presence up to even pre-glacial times. That, at such periods, he was not the perfect creature which Dogma would have us believe, but that he was very little superior to the brutes about him: the southern elephant, the rhinoceros leptorhinus, the great hippopotamus, and probably a contemporary of the mastodon, we have the most conclusive evidence in the shape of rude stone, bone, and bronze implements which have been found in deposits which cannot be less than fifty thousand years old. If, at that comparatively late period of his existence, the creature with a human brain had only progressed so far, we may reasonably form a low estimate of his condition hundreds of thousands years earlier, and may carry ourselves back in imagination to that dim past when he first learnt to make a fire, or further still, to that period when, like his ape-brethren, he lived in the trees and fed on their fruits.

Having been compelled by the irresistible logic of fact to abandon her pretensions to reliability as an exponent of truths which Science can examine, Dogma has finally ensconced herself behind "truths" which Science cannot examine. She has disavowed the intention of longer posing as an authority on the physical cosmos. She candidly owns that all her "verifications" about this subject have been proved conglomerations of ridiculous fallacy. Her retreat is not premature; rather has it been too long deferred. She has valiantly defended her positions as, one by one, they have tottered about her ears. But the question arises, are men willing that she shall dictate about matters outside the physical cosmos? Having proved herself such a blind leader into the comparatively

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simple mysteries of the natural, are men prepared to follow her into the infinitely more perplexing depths of the supernatural? Can they longer respect the guide who has so grievously misled them? Dogma, herself, by the consensus of her most open-minded professors, has renounced the claim which she maintained for ages, to a special inspiration for her traditions; yet, she bases on these traditions the claim to the authority which she still vigorously asserts. This procedure seems the reverse of logical. If her traditions are not good enough authority to establish against Science one set of principles maintained from the beginning of her existence, as divine truth, why should another set of principles, based on the same traditions, be exempted from the scrutiny and modifying influence of Science? Should we not, under the same circumstances, in any ordinary affair of life, increase our suspicions, according to the fallacies we had discovered, casting a double onus on the would-be authority to verify the conclusions which we had, as yet, been unable to probe?

Criticism has now placed beyond doubt the fact that all the books of our Bible have been written, in the ordinary way, by men liable to err: the old doctrine of a special inspiration is irrevocably, utterly, exploded. Protestantism, by the avowal of its most rational followers, has accepted this position. The following remarks by the Rev. A. W. Momerie, show the present temper of enlightened ecclesiasticism towards the doctrine of inspiration:—"In many respects, as we have already seen, the Scriptures do not differ from any other collection of human writings. The different authors write in different styles; they hold different, and often inconsistent, opinions; one writer contradicts another, and not unfrequently the same writer contradicts himself; the science in the Bible is all wrong; the history is full of inaccuracies; and even the moral and religious teaching is sometimes barbarous and degraded. I have given you numerous illustrations of all this. With

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many of them, if you have read your Bibles carefully, you must have been already perfectly familiar. Whatever then we mean by the Bible being inspired, we cannot mean that it was written by God. To allow ourselves, even for a moment, to entertain such an idea would be blasphemy."

We are here told that, not only does the Bible err on subjects within the special domain of Science, but that its guidance is not to be indiscriminately accepted even on such a point as morality and religion! Remember that this is no avowed sceptic who tells us these facts. They are the deliberate conclusions of a churchman.

Now, what we sceptics ask is, by what criterion men are to discriminate between those parts of the Bible which are "all wrong" and those which are "all right." We have the very strongest reason to assume that, had not Science opposed the Bible, enlightened clerics, such as the Rev. A. W. Momerie, would still have resolutely denied that there was anything "all wrong" about it. Accordingly we infer that even ecclesiastical reason is not proof against Science: that, even to suit churchmen, the Bible must not insult the understanding of an average school-boy. Then, as these churchmen admit scientific and critical verifications as the criteria by which their own judgment determines biblical authority, we ask them to be consistent: to accept these verifications as criteria not only against a part, but against the whole of their system. We maintain that Science, so far as the question is susceptible of human scrutiny—and, in this respect, it does not differ from other ultimate questions—has disproved to demonstration Dogma's definition of an anthropomorphic deity: a magnified man-god. We maintain that every line of scientific enquiry tends as utterly to demolish this, as any other assumption of Dogma. Now, we ask Dogma to controvert Science on this point, or yield to her, as on others. We maintain that the onus of proof of her anthropomorphic deity rests with Dogma, and we utterly scout human emotion as of the

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slightest moment in deciding the point. We demand objective proof entirely outside human aspiration, or an unconditional surrender of the hypothesis. We demand that such proof shall take the shape of disproof of the latest verifications of biology and scientific psychology; that any theological theory shall be established against Science, in respect to a definition of Deity, as it would need be in respect to a theory of the shape of the earth. We will no more admit human emotion as a determining factor in the one than in the other case. We require Truth, and we care not one jot whether that Truth shatters all the idols nearest to the hearts of mankind. We maintain that, if the writers of biblical "science" are to be criticized by human reason, the writers of every other part of Scripture must stand or fall by the same scrutiny. If it were within the scope of our present plan, we might easily show that the essential parts of Scripture are no more dependent on the conventional conception of deity than they are on the pseudo-science of biblical narrative. We might show that the gist of Scripture is idealized conduct, and that this has not the remotest connection with definitions: that whether we conceive God as a magnified man, or as the Inscrutable of Science, matters only in respect to truth, not to conduct. To any reader who wishes to work this out for himself, we would recommend the perusal of Matthew Arnold's works: "God and the Bible" and "Literature and Dogma."

From whatever point of view we look at them, we find that the methods by which Dogma has established her conclusions, are utterly obnoxious to the present phase of mental development. We find even her own votaries impatiently chafing under the affront to their reasons, entailed by the compulsion to propound as truth what reason tells them is fallacy. Tradition has now so often been proved a liar, that its own devotees are only prevented from giving it quietus, by the fear of consequences. It is

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not the conviction of the truth in tradition which mainly impels its enlightened professors; rather is it the terror that, unless they have something to propound, their occupation will be gone. However, the day has arrived when tradition can no longer escape the scrutiny which man devotes to every other assumption of authority. Men are even inclined to treat tradition as an established impostor who must be assumed to lie in default of proof to the contrary. This result would have occurred earlier had Nature provided the necessary re-adjustment, without which, men's minds, through habit alone, submit to antique delusion. Mankind will contentedly mumble formula long after they have ceased to care whether that formula represents truth or fallacy. Let them only mumble what their great-grandfathers mumbled, therein lies soothing comfort!

Well may Maudsley, a great authority on mental disease, write, in reference to religion or what passes as religion: "The majority of men discharge its duties automatically, and accept its doctrines formally, paying to these a lip-homage, without ever having a distinct grasp of them, or ever pursuing them in thought to their logical consequences. They believe vaguely, without ever caring to realize distinctly what it is they think they believe; are content with a kind of belief which they would certainly at once repudiate in their worldly affairs. It needs no argument to prove that such a slovenly habit of thought is not only not conducive to, but is greatly hurtful to, mental culture, and that any mind, which is content to hold beliefs on those terms is ill-fortified by the development" (or rather, we may say, the non-development) "of its powers, to exercise sound reflexion on other subjects, or to react vigorously to the end under the burdens laid upon it."

The fact is that people of this description have an instinctive dread of pursuing their so-called religion to its logical end; they have a presentiment that such pursuit will only lead them to a quagmire of disappoint-

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ment and perplexity; like children who try to blind themselves to the defects of their broken toys, they prefer make-believe to truth. The only people who can nowadays pursue this so-called religion to its logical end and smilingly contemplate the consequences, are those whose "bread and butter" hangs on the result of their scrutiny. It is marvellous how one's capacity to swallow develops under such circumstances: how stolidly one can then gulp the impossible! The writer would suggest, as the most powerful incentive to "orthodox" conviction in the England of to-day, as the greatest blow to scepticism which the Church could deal—that no reverend enthusiast should consent to receive more of worldly compensation for preaching and exemplifying his doctrine than would suffice to give him a roof over his head, covering for his body, and three meals each day. Then, we sceptics should surely own: these are more than professors of their cult; they are its lovers!

But scepticism is destined to receive no such staggering blow as this. Saints, nowadays, are not proof against the blandishment of "purple and fine linen!" Though the thirty-eighth Article of Religion would seem to imply a fear that saints might develop an unorthodox tendency towards discarding the things of the flesh, so far, such fear has proved groundless.

But, it may be urged, surely there must be some inherent justification for dogmatic pretension, or why should men so long have endured it—why, say, during the last half century of comparatively active intellectualism, have men submitted to medieval ignorance?

Such questions are fully answered by the latest scientific verifications, which tell us that what one generation has thought, quite irrespective of the truth or fallacy of the thought, a succeeding generation is innately prone to think. Established delusion is hard to extirpate, because between one generation and the next there is a transfer of

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similar automatic tendency of thought. Few men are able to approach any question with an absolutely open mind. Innate prejudices and prepossessions co-operate to perpetuate long-standing delusions, which are only ultimately demolished by some drastic operation of Nature on the cerebral type, which has to be modified to receive the new idea. We have ample evidence that this cerebral modification has in the mass of men, now reached the point of efficiency of rendering them capable of assimilating the new verification which a few open minds have discovered. Under these circumstances, we may infer that Dogma has nearly reached the natural limit of her existence. Like everything else in the universe, she must conform to the drift of evolution, or succumb.

By another method of reasoning we are led to the same conclusion. Viewing the question of Dogma or no Dogma as one affecting merely the selfish expediency of society, we see that one main reason why dogmatic pretension is still tolerated, is that mankind, notwithstanding the contrary assumption of enthusiasts, have very little genuine concern for what Dogma maintains or denies. Dogma's salvation has been the collective indifference of society, which takes merely the interest of dilettantism in dogmatic theory. The very deadness of popular interest in such a matter would show that man needed a new revelation. Who can doubt this apathy, who cannot discern that Dogma's supernatural is stone-dead to the masses? Had Dogma presumed to meddle with any of the ordinary affairs of mankind, by such authority as her traditions, does anybody suppose that mankind, within this century, would have accepted her credentials? No. Society argues: They are good enough to establish a theory, but not a practice. We would not be dictated to in even the most trivial matters of every-day life on such authority as we consider good enough to establish Dogma's supernatural!

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Now comes the revelation of Science, showing the world that all men's dealings, one with another, are vitally affected by a hitherto undreamt-of fact. Men must heed this new revelation as they have never heeded Dogma. The supernatural which men are now fated to receive is the Supernatural of Science—the Supernatural which will strike home to the very marrow of their convictions!

Had men known, two hundred years ago, what we know now, assuredly we should be treating Dogma as we treat Pagan mythology: we should be looking at it objectively. If men, eighteen hundred years ago, had known what we know, Dogma would have been still-born. Had we now, for the first time, to consider what Dogma propounded seventeen centuries ago, we should treat it as the illusion of insanity. Our medical experts would tell us that the promulgators of those doctrines were lunatics. We are now blinded to the glaring inconsistency between our procedure and our mental advance solely by long-continued habit of thought, which, as it were, hypnotises us into automatic affirmation of what, we instinctively feel, is false. However, the change seems now to have arrived; Nature has done the shaking. Many are out of the trance; soon all will be awake.

The world has hitherto been content to accept pseudo-fact twisted into all sorts of ridiculous shapes to suit the purposes of Ecclesiasticism. Now the world is going to twist the old joints of Ecclesiasticism to suit Fact!

The effect of recent scientific research must inevitably be to destroy that theological pretension which, for centuries, has tried to strangle all that is best in the human mind. The system which produced a Torquemada must now yield to that which gave birth to a Galileo. The system whose contentions have caused more bloodshed and misery, whose profession has cloaked more infamy than all the remaining affairs of humanity, must give place to Science, the true servant of man.

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But, it may be asked, does not renunciation of the "free-will" conception amount to a doctrine of fatalism? What motive is then left for striving? If the "will" be a myth, why should not man sit and await the inevitable? The answer is: Because the drift of evolution prevents him. The majority are so constituted as to conform to this drift; they are innately emulative to further Nature's design.

The drift of evolution in relation to civilized society, is that organic tendency of the majority which, by spontaneous variations, has effected those changes of which the latest culmination is the prevailing social homogeneity. The "fit" majority are those who are innately disposed to conform to their life-conditions; the "unfit" minority are those innately disposed to rebel against such conditions. The latter suffer in the struggle for existence. The law that the "fittest" shall survive is as true in London civilization as in the virgin forests of New Guinea. Nature everywhere exacts a penalty from the creature for her own inconsistency.

Civilized man is only, in degree, merciful to his "unfit" fellow. When such "unfit" member assails the integrity of society, the "fit" majority have no alternative; society must obey Nature's mandate, and mercy then become a mere theory. The physically "unfit" suffers; so does the mentally "unfit"; the one through bodily pains, the other through social oppression.

The man who sits and awaits the inevitable has his conformation awry. He is out of touch with the majority. He is an "unfit" member of society. The "fit" man cannot sit and await the inevitable. He must be up and doing, because he is a healthy part of an organic whole whose innate tendency is to be up and doing. We may, when the new truth is assimilated, considerably modify our views and practice in respect to the treatment of the criminally "unfit"; but, when all is said and done, society

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in its own defence, will continue to exemplify the cruelty of Nature, and selfishness, which we started by assuming tantamount to "evil," will prove itself the great incentive which keeps humanity at the pull, spurring the majority to conform to the drift of evolution.

CHAPTER VII.

THERE is another point of view from which we may well look at this "free-will" assumption.

According to the anthropomorphism of Dogma, the Deity is a combination of intelligence, omnipotence, omniscience, justice, love and mercy. There is no doubt as to the certainty with which Dogma, in her own opinion, has settled this awe-inspiring question. Nevertheless, benighted men, with only reason to guide them—mere scientists and critics—have never been able to assimilate this tremendous verification of Dogma. Such men would persist in the absurd supposition that it might not be true, after all; that any attempt at definition of even a trivial aspect of the Deity was too tremendous a *crux* to be approached even by such an inspired enquirer as Dogma! And it must be confessed that these perverse sceptics have put Dogma to many straits to establish her point—even to her own satisfaction! Now, we will not attempt directly to disprove this great verification. We have no desire to assail any theory which attributes to Deity all the might and majesty within the conception of poor humanity. What we now purpose doing is to use this theory of a Creator's might and majesty to demolish another which would rob Him of these attributes. As this latter theory is also a verification by Dogma, we must ask her to decide which she will retain: the theory that the Deity is intelligent, omnipotent, omniscient, just, loving and merciful; or that man is endowed with "free-will." One, Dogma must renounce.

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She has, in conformity with venerable precedent, tried to extricate herself from this dilemma with the customary verbal jugglery which does so much honour to her ingenuity; nevertheless, ordinary men, with no theoretical "axes to grind," prefer commonsense methods of reasoning to metaphysical necromancy. Let us, as ordinary men, consider the reciprocal effects of these two theories.

In the one case, we have this mighty, just, loving, and merciful creator; in the other, a creature endowed with a law-bound organism tied to a free agent with which this organism is in perpetual conflict, and for the issue of which conflict the creature is held eternally responsible. Does not contradiction stare us here in the face? Can we, by any natural effort of mind, realize a creator with intelligence, omnipotence, omniscience, justice, love, and mercy, whose intelligence leads him to endow a creature with an eternally punitory imperfection; whose omniscience foresees that this imperfection will doom the creature; whose omnipotence, nevertheless, does not prevent the endowment; whose justice holds the creature responsible for it; whose loving mercy dooms the creature to eternal penalties for its results? Can this creator possess all these attributes and man possess a "free-will," corrupt body, and be answerable for both? Does not the human mind absolutely scout this conception? Does not Dogma, by propounding it, blaze abroad her own fatuity? Does not reason tell us that either this creator is devoid of some of the qualities attributed to him, or that man is devoid of "free-will" and its concomitant possibilities?

Could a loving and merciful creator send creatures into life, knowing that the qualities with which he had endowed them would eventually drag those creatures to perdition?

If that creator did not foresee the creatures' life-issues, could he be omniscient?

If he did foresee them, but could not control them, could he be omnipotent?

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Granted that the creature is assumed to have "a will which is miraculously, supernaturally free," this, of course, would not affect the fact that the ultimate result of this freedom would be known to the omniscient power which had endowed the creature with it.

Dogma saw her difficulty, and, being innately anxious to survive, decided to modify her specially constructed creator. As a snug monopolist, she realized that her occupation would be gone if she killed "free-will"; as a clever tactician, she decided to kill the omnipotence and omniscience of her creator. She now gives us to understand that "The Divine thought and will which absolutely determine instinctive life, so far limit their interference in the human soul as to leave a really directive originating activity to our will!"

Granting to Dogma the most absolute right to lop away as many of her specially devised creator-attributes as she likes, let us see whether a further sacrifice will not be needful. We have still the loving and merciful creator, who sends creatures into the world with the possibility that their involuntary entrance may earn them eternal torments. Of course, we know it is only a possibility, and that they *may* earn an eternity of bliss; nevertheless, this possibility is hard to reconcile with the love and mercy. Ordinary people would suppose that, under the circumstances, more love and mercy would be shown were no such possibly doomed creatures to exist, even though the eternally-to-be-blessed were also non-existent. But Dogma is not an ordinary person! No donbt, her native ingenuity will again enable her to wriggle to victory—in her own opinion! In the meantime, whatever her two conceptions may appear to the inspired brains of Dogma, to those of ordinary mortals they seem mutually destructive, and by advancing them, Dogma seems to be very effectually testifying for her antagonist—Science!

All our sensations are strictly subjective; the reality

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which we think we perceive is merely what hereditarily developed organism has animalized, or imbued with its own specially conceived attributes. What we call brightness does not exist outside ourselves. Colour is merely a subjective impression, quite different from reality, which is diversity in extent, form and rapidity of ethereal vibrations. Sound is just as subjective. There is no such thing outside ourselves. If we could see what constitutes to us sound, we should find it a comparatively slow agitation, alternately compressing and dilating particles of air, independently of the inherent intensely rapid motions of such particles among themselves. Our classification of sounds according to pitch, loudness, or quality, is entirely subjective. The objective reality is variable rapidity and direction of aerial motions. We feel pain from a blow; yet, the motion of the stick is as different from our sensation as is the ethereal vibration from what we call sound and light. Hence, it is as contrary to reality to apply the customary meaning to light and sound as to call a moving stick pain. This applies also to all unscientific conceptions, even including those of Dogma! We may as well call a moving stick pain as allow the remotest approach to reality to the anthropomorphic notion of Dogma. To anybody who has the faintest inkling of the immensity of the scientifically verified Deity, the conception of Dogma must appear the veriest creation of infantile fatuity.

"Many excellent people are crying out every day that all is lost in religion unless we can affirm that God is a person who thinks and loves. We say, that unless we can verify this, it is impossible to build religion successfully upon it; and it cannot be verified. Even if it could be shown that there is a low degree of probability for it, we say that it is a grave and fatal error to imagine that religion can be built on what has a low degree of probability. However, we do not think it can be said that there is even a low degree of probability for the assertion that God is a person who thinks

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and loves, properly and naturally though we may make him such in the language of feeling; the assertion deals with what is so utterly beyond us. But we maintain that, starting from what may be verified about God—that he is the Eternal which makes for righteousness—and reading the Bible with this idea to govern us, we have here the elements for a religion more serious, potent, awe-inspiring and profound, than any which the world has yet seen." (Matthew Arnold.) This is the religion which Science is working to establish: a religion satisfactory to reason and experience; a religion free from quackery; free from the sensualities of carnal conception; free from the dictatorship of "expert" pretentiousness; free to the hearts of mankind, unexpounded by sacerdotal ingenuity.

Civilization is rapidly realizing that expounders of "orthodoxy" are superfluous; that religion is not a craft or science which needs a schoolmaster; that it is not even a vocation which men should adopt for the sake of earning their bread; but, that it is the birth-right which every man may have for the asking, which every man is qualified to enjoy in his own way, and which, it is best, he *should* enjoy in his own way. It exists not by virtue of metaphysical definitions, not by virtue of a magnified man-fetish, but through the innate voice which tells humanity there is an inconceivably mighty Cause behind this universe. Let Ecclesiasticism console itself with this certainty: that though it go with Dogma to oblivion, religion will live as long as humanity!

The comparative claims of Ecclesiasticism and Science on the intellectual respect of mankind are forcibly illustrated in the following passage from Dr. Draper's book, "The Conflict between Religion and Science." Remember that Ecclesiasticism, in every past age, has been eager to enforce its conclusions on mankind by the persuasive arguments of fire, axe, and torture. Whether disinclination, or inability, to-day prevents the employment of similar logic, by the militant Christian Church, let the past decide.

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"When Science is thus commanded to surrender her intellectual convictions, may she not ask the ecclesiastic to remember the past? The contest respecting the figure of the earth, and the location of heaven and hell, ended adversely to him. He affirmed that the earth is an extended plane, and that the sky is a firmament, the floor of heaven, through which, again and again, persons have been seen to ascend. The globular form demonstrated beyond any possibility of contradiction by astronomical facts, and by the voyage of Magellan's ship, he then maintained that it is the central body of the universe, all others being in subordination to it, and it the grand object of God's regard. Forced from this position, he next affirmed that it is motionless, the sun and the stars actually revolving, as they apparently do, around it. The invention of the telescope proved that here again he was in error. Then he maintained that all the motions of the solar system are regulated by providential intervention; the 'Principia' of Newton demonstrated that they are due to irresistible law. He then affirmed that the earth and all the celestial bodies were created about six thousand years ago, and that in six days the order of Nature was settled, and plants and animals in their various tribes introduced. Constrained by the accumulating mass of adverse evidence, he enlarged his days into periods of indefinite length—only, however, to find that even this device was inadequate. The six ages, with their six special creations, could no longer be maintained when it was discovered that species, slowly emerged in one age, reached a culmination in a second, and gradually died out in a third. This overlapping from age to age would not only have demanded creations, but re-creations also. He affirmed that there had been a deluge which covered the whole earth above the tops of the highest mountains, and that the waters of this flood were removed by a wind. Correct ideas respecting the dimensions of the atmosphere, and of the sea, and of the operation of evapora-

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tion, proved how untenable these statements are. Of the progenitors of the human race, he declared that they had come from their Maker's hand perfect, both in body and mind, and had subsequently experienced a fall. He is now considering how best to dispose of the evidence continually accumulating respecting the savage condition of prehistoric man."

What institution, other than ecclesiasticism, could have survived a tithe of the above evidence? Is it possible to adduce more cogent testimony to the entirely human nature of that institution, and to the preposterous vanity of its pretensions?

I will supplement Dr. Draper's illustrations by one more which has come into prominence since his book was published.

The ecclesiastic still asserts that man has a "will" which is "miraculously, supernaturally free." He must now consider how best to reconcile his idea with Darwin's verification respecting the "Origin of Species"; with Weismann's theories of the origin of Life and "The continuity of the Germ-plasm"; with Ferrier's "Cerebral Localization"; with the researches of Spencer, Bastian, Luys, Flourens, Huxley, Galton, Bain, Wallace, Ribot, Romanes, and the whole host of Science busy supplanting the darkness of bigotry by the light of Truth; busy showing that nothing created is "free": that, from man to molecule, creation is the creature of Law.

In the life-and-death struggle now raging between Sacerdotalism and Science—between Darkness and Light—who can doubt the issue? Who can doubt which is "fittest to survive": which, really, conforms to the drift of evolution?

Will the "Time-spirit" now tolerate despotism over conscience, reason, and experience by the system which argued with rack and thumbscrew; which proved its doctrines by the evidence of "demons" and lunatics, and "infallible"

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Decretals (often reversed!); which, by a man's ability or inability to float in hot water, to hold red-hot iron in his hand, to keep his arms extended like a cross, established his guilt or innocence of the crime of listening to reason; which, after the verdict of guilty so obtained, condemned the prisoner in this sweet formula: to be punished "as mercifully as possible, and without the shedding of his blood" (the Holy Church's method of condemning the prisoner to the stake!).

To say that Ecclesiasticism would not do such things now, is merely to state it *dare* not. The principle is active as ever; only the weapon is changed. In these days, the tools of Ecclesiasticism are excommunication, social ostracism, the imputation of "damnable heresy," insidious appeals to the emotion of ignorance. Ecclesiasticism still exemplifies the unalterable edict of Nature. It is still endowed with the instinct of self-preservation. Like the individual man, it is still selfish. Still, its cry is: Perish Science, perish Truth, that Ecclesiasticism may live! Though we ecclesiastics do not, ourselves, believe half we profess and preach—as we love our blessed calling too fondly to be honest—we must continue to profess and preach delusions, and *what we believe delusions*. Still, let us promulgate that precious dogma transmitted to us by the only creatures to whom The Almighty has vouchsafed Light: the popes, monks and fathers of that period of human enlightenment when the earth was "infallibly" decreed flat and the centre of the universe; when empty space was decreed the floor of heaven, the antipodes, the location of hell!

There is nobility in the selfishness which aims at ideal "good," looking for no reward but a Maker's; but, for the selfishness which promulgates, under the guise of divine revelation, what it knows to be the fallible concoction of partisan brains; for the selfishness which, for the sake of emoluments, social position, sordid self-aggrandizement,

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proclaims as divine truth what, it feels, is a lie—for such selfishness what term of contempt can be too strong?

With the late Cardinal Manning's opinion that no honest ecclesiastic can die rich, or live a life of luxurious ease, everybody who looks beneath the mere surface-meaning of honesty, must agree; to the proposition that no honest sceptic can wear the cloth of the Church, none can object. Then let all ecclesiastics, Protestants and Catholics, who cannot conscientiously assent to the Thirty-nine Articles; who do not believe in the specially conceived inspiration of the Canon; who, in their hearts, reject the Vatican's assumption of infallibility; whose minds discard orthodox so-called miracle—let these clerics decline to wax fat on the "loaves and fishes" of their respective rituals, or abandon their pretensions to expound, by life and teaching, a sacred ideal to mankind! Let them show that a professedly holy calling has a higher propelling motive for its followers than the necessity of earning one's bread!

The writer would suggest to those whose emotions have rendered them the slaves of a sentiment of reverence for dry bones, that they read such a book as "The Conflict between Religion and Science," or any impartial account of the rise and growth of Sacerdotalism, and then decide whether that system has not consistently enslaved men's minds, outraged their bodies, blighted their lives, and insulted the ideal preached by the Founder of Christianity.

One word in Dr. Draper's title to his book would seem a misnomer. Science is quite ready to bow to the ineffable teaching of Christ. Her blow is directed at no true religion, at no noble ideal. What Science is fated to destroy is, to put it in one word, Athanasianism: the arrogance which presumes to determine for mankind what it is the fundamental right of every man to determine for himself; the arrogance which dogmatizes to "free-will" and then ferociously denies it the right of manifestation; the system which gave men formula for fact and tortured

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them if they rejected formula; the system which corrupted the noblest idealism into a traffic in "indulgences" for the free perpetration of infamy; the system which is now and always has been trying to undermine the social stability of the world—which sets nation against nation and man against man; the system whose headquarters was the rallying point for the world's place-hunters, the greatest sink of simony, usury, bribery, corruption, recorded in the annals of mankind!

For Protestantism there is hope of reconciliation with Science; for Roman Catholicism, none. Her battle-cry is, was, and always will be, "Ignorance is the mother of devotion!"

CHAPTER VIII.

To any attentive observer, it must be evident that Ecclesiasticism is rapidly helping forward its own disintegration. On the one hand, its champions display the unabashed bigotry of medieval intolerance; on the other, the Latitudinarianism which clearly realizes the "Time-spirit" and the penalty of opposing it. These mutually destructive agents are unconsciously promoting the work which, it is their whole object to prevent. Between the two, Ecclesiasticism may well exclaim: Heaven preserve me from my friends!

As an imitation of the good old crusted medieval championship, we may instance that precious document recently promulgated by thirty-eight "eminent" clerics as a bulwark against modern scepticism.

These "eminents" tell us: "We believe the Scriptures because they have the authority of Divine Revelation, and wholly independently of our own, or of any human, approval of the probability or possibility of their subject-matter;

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and wholly independently of our own or any human and finite comprehension thereof." There is no ambiguity here. These "eminents" mean what they say. They believe "*Wholly independently of any human approval of the possibility of the occurrences in which they believe!*" We must candidly confess that, to *believe* what *we* think impossible, is, to us, impossible. *Our* poor mind requires that reason shall sanction what *we* believe. Apparently, these "eminents" manage *their* thinking without the aid of reason. All honour to such prodigies! We would not presume to argue with "eminents" of this calibre. We will, however, confirm their testimony by that of two more "eminents." This is the more necessary, as these "eminent" thirty-eight tell us that "the faith of many Christian people is unsettled;" that those who differ in opinion from the thirty-eight are "manifestly dishonouring God" and "imperilling the eternal life" of themselves and of those whom they influence by "undermining all faith in the mystery of Christ and in the supernatural." Surely it behoves us to corroborate these "eminent" thirty-eight! We will do so. We will annihilate all sceptics! Hear that fine old churchman, Burgon: "The Bible is none other than the voice of Him that sitteth on the throne. Every book of it, every chapter of it, every verse of it, every word of it, every syllable of it, every letter of it, is the direct utterance of the Most High. The Bible is none other than the word of God; not some part of it more, some part of it less, but all alike the utterance of Him who sitteth upon the throne—supreme, absolute, faultless, unerring." Hear that fine old churchman, Baylee: "The Bible cannot be less than verbally inspired. Every syllable is just what it would be had God spoken from heaven, without the intervention of any human agent."

It is refreshing to contrast with the balderdash of the "eminent" thirty-eight the subjoined circular issued by a

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committee formed to organize a Central Congress of Religions at Chicago in 1893 during the exhibition, side by side with the sectarian gatherings which will take place. It runs thus: "Now that the nations are being brought into closer and friendlier relations, the time is apparently ripe for new manifestations and developments of religious fraternity. . . . Convinced that of a truth God is no respecter of persons, but that in every nation he that feareth Him and worketh righteousness is accepted of Him, we affectionately invite the representatives of all faiths to aid us in presenting to the world, at the Exhibition of 1893, the religious harmonies and unities of humanity, and also in showing forth the moral and spiritual agencies which are at the root of human progress." The remarkable thing about this circular is, that it is signed by sixteen ministers representing all the confessions of the United States, from a Catholic Archbishop (Mgr. P. A. Feehan) and an Episcopalian Bishop (the Rt. Rev. W. E. McLaren) to a Unitarian of the advanced Western School (the Rev. Jenkin Lloyd Jones), and a Jewish Rabbi (the Rev. E. S. Kirsch), the President being a Presbyterian (the Rev. J. H. Barrows).

We will not offer further comment on the overpowering testimony of the "eminent" thirty-eight, but we will humbly venture to draw their attention to some remarks presumptuously aimed by a certain atheistical child of perdition named Matthew Arnold, at two other champions of the faith—the then Bishops of Gloucester and Winchester. These remarks appear in Arnold's books: "God and the Bible" and "Literature and Dogma." Probably the "eminents" have read Arnold's words but are ecstatically impervious to their logic. Others, less eminent, may find them useful. Further, as contradictory statements of authorities are apt to unsettle the average layman, we will venture to ask these "eminent" thirty-eight to confound the utterance of a modern churchman: the Rev. A. W.

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Momerie, M.A., D.SC., LL.D., late Fellow of St. John's College, Cambridge; late Professor of Logic and Metaphysics in King's College, London. He tells a perplexed public that: "Nothing but self-conceit could ever have led men to the conclusion that while the sacred books of other nations had a purely human origin, their own Scriptures came direct from the Deity Himself. . . There is not then a single sentence in the Bible which lends a shadow of support to the orthodox doctrine of inspiration. And even the most cursory examination of the Bible *as a whole* might, one would have supposed, suffice to show that that doctrine is utterly and absolutely false. . . And finally it is not the same Deity that is revealed throughout the Scriptures. The gods of the Bible are many. The representations of the Divine Being differ from age to age, and from writer to writer. We cannot possibly overestimate the difference—it is practically infinite—between the God of Samuel who ordered the infants and sucklings to be slaughtered, and the God of the Psalmist whose tender mercies are over all His works; between the God of the patriarchs who was always repenting, and the God of the apostles who is the same yesterday, to-day and for ever. . . But when we come to examine the Bible, we find the 'Lord of Hosts' not unfrequently represented as morally inferior to an average man. Just look at 1 Samuel xv. 1-3, Samuel said unto Saul, 'Hearken thou unto the voice of the words of the Lord. Go and smite Amalek and utterly destroy all that they have; slay both man and woman, infant and suckling, ox and sheep, camel and ass.' If a modern general were to give such an order, he would be considered a monster of iniquity. But the early Jewish writers *imagined that the cruelty and fierceness of their own savage natures were actually characteristics of the Deity.*" The italics are the writer's. He would like an explanation from the Rev. A. W. Momerie of what constitutes the fundamental difference between the reverend gentleman's

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anthropomorphism and that of these ancient Jews. He would like to know what greater warrant there is for the one than for the other. In the meantime, he will hazard the opinion that both have the same origin: the human imagination; and that the one is just as much as, but no more than the other, established as fact. Ordinary men will no doubt accept the Rev. Mr. Momerie as a spiritual guide rather than the "eminent" thirty-eight; nevertheless there seem a few well-developed motes in the eyes of this keen-sighted cleric. How came the demolisher of the special inspiration of the Bible, the scoffer at the Athanasian creed, the critic of the Decalogue, to write these passages: "Men like Tyndall and Huxley are no tyros in natural philosophy; they have waded deep into it; and yet their minds are not brought about to religion. . . Men who enthusiastically cultivate the intellect are very apt to ignore and neglect the heart." Will the reverend gentleman define this "Heart," and, pending his definition, allow us to assume that he means the vague aspiration which impels men to grasp by imagination what they cannot grasp by their senses? Has not Intellect evinced the greatest attachment towards this "Heart"? Has not Science proved that the capacity to imagine, to grasp at phantoms, to yearn for the unattainable, is merely a special cerebral sensibility absolutely dependent on combinations and interactions of nerve-fibres and cells? What greater proof of Intellect's devotion to "Heart" can the reverend gentleman desire, than that the former embraces the latter as twin-brother?

With Science assailing her on the one side, and her friends "protecting" her on the other, the English Church seems in a sorry plight. It is hard to decide who threaten more vitally: the Tyndalls and Huxleys, or friends such as the "eminent" thirty-eight!

The only sacerdotalism safe from its friends is Roman Catholicism. This, too, is the only retreat for those afraid

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of their reason. There, the Newmans find the Nirvana unattainable elsewhere. There, they can strangle at ease their God-given faculties. However, Nature is now bent on having humanity of a sturdier mental fibre than are renegades from reason. Every new day clinches a new nail into the coffin of Roman Catholicism. Every day, Nature is more emphatically proclaiming that humanity is out of its swaddling-clothes! If the Church of England wishes to escape the impending fate of Rome, she must show her adaptability to the drift of evolution. She must pitch overboard Dogma, or Dogma will send her to the bottom! Her sole business must be to promulgate, by precept and example, what was exemplified by the Founder of Christianity. She must deal with practical conduct, not with metaphysical shibboleths. But, whether she averts or courts destruction, all will happen in conformity with that Law immanent from molecule to universe.

The gist of the New Testament is a record of fragmentary sayings by Christ, which it is now the province of nineteenth-century reason to sift from the worthless sensualities of His reporters: men saturated with the superstitions and childish ignorance natural to their time and race. Christ wrote nothing. All we know about Him is what the brains of densely ignorant men have transmitted in the shape of records coloured by the superstitious bias natural to such men. These records, as we have them, had previously passed through at least half a century of oral tradition and through more than one written account. Naturally, we find all the reporters of Christ anxious to impart the narrow tinge of contemporary thought to utterances applicable to all times. Critically examined, the New Testament clearly shows that Christ was so utterly beyond the mental grasp of His disciples, as to render them unable, even faintly, to conceive the true teaching of the Master. This is the cardinal fact which modern ecclesiasticism must realize, if it hopes to reconcile itself with the thought of to-day.

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The aim must be not to reconcile facts with the ignorance of Palestinian Jews, but to utilize the true teaching of Christ. All but this is now dross to mankind. Let modern churchmen realize that a new dispensation has now arrived: that the need is, not dialectical ingenuity to preserve, but commonsense to discard what is now an obstruction to religion.

It is beyond our purpose here to establish this proposition by a critical survey of the Bible. Any reader may verify the accuracy of our statement by referring to the best independent criticism now extant, such as Matthew Arnold's. Such criticism is truly conservative, as distinguished from the destructive efforts of the "thick and thin" school of biblical advocacy, which only renders its cause ridiculous in the eyes of thinking men. Than the whole order of such champions, Matthew Arnold will better enable the average man to reconcile his Bible with his reason; to realize the true greatness of the record, and to use it in the only manner compatible with the mental condition of his age. In such criticism he will find proved "to the hilt" the statement that every saying attributed to Jesus and implying "miracle," is the effect of distortion by the imaginations of His disciples.

Resurrection, the great word of the New Testament, *never appears in the canonical books of the Old.* But it appears in the Apocrypha, several of which books, such as the Book of Tobit, Wisdom, Ecclesiasticus, the Book of Enoch, were only, by the merest accident, excluded from the Old Testament Canon. The worship of the letter of scripture by Rabbinism, at the advent of Christianity, alone prevented our receiving such books as the equals, canonically, of the rest of the Old Testament. The new faith, Christianity, rendered these Jews antagonistic to any records not included in the Hebrew Canon formally approved at the time of Judas Maccabeus, about a century and a half before Christ. As the Greek Bible, then the Bible of Christianity,

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had admitted these books which we call apocryphal, as Canon, Jewish sacerdotalism had its own version re-translated into Greek. By the mass of Christians, however, what we call the Apocrypha was accepted as Canon, and the Latin translation of the Septuagint reproduced these books. At the time of the African Synods, at the end of the fourth century, the Church stamped the Apocrypha as having equal authority with the Hebrew Canon. At the Reformation, Protestantism reverted to the latter.

We are apt to think that, through whatever contentions the religious writings of the Jews, constituting the Old Testament passed before they became accepted as real Bible, at anyrate, in our New Testament, we have records about whose authenticity there was never any doubt. Does not the sixth Article of Religion, in a deliberate misstatement of fact, tell us that "Holy Scripture containeth all things necessary to salvation: so that whatsoever is not read therein, nor may be proved thereby, is not to be required of any man, that it should be believed as an article of the Faith, or be thought requisite or necessary to salvation. In the name of the holy Scripture we do understand those Canonical Books of the Old and New Testament, of whose authority was never any doubt in the Church." Does not this statement assert the preposterous claim to never-questioned authority for both Old and New Testament, and, in the face of modern criticism and scientific research, does not this untruthful Article cry aloud for expunction?

There has been just as much wrangling by sacerdotalism to establish the New as the Old Testament Canon. Only by the chance decisions, often of the barest majorities, of various assemblies of men, who, judged by our standards of knowledge, would be deemed densely ignorant, do we now acknowledge as authentic our New Testament record. The documents composing this appeared at different times, and many early Christians treated them as comparatively un-

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reliable. Thus, Papias, one of the earliest and most important witnesses to the written narrative, remarks, about 140 years after Christ: "I did not consider things from books to be of so much good to me, as things from the living and abiding voice," meaning speakers who had heard the voice of Jesus. For Papias, there was evidently no body of record answering to our New Testament Canon. The first authoritative declarations of this Canon, were, for the Eastern Church, the Festal Letter of St. Athanasius, the date of which is about A.D. 365; for the Western Church, the two Synods of Carthage, held, respectively, in the years 397 and 419. Only, after these latter, with any approach to truth, could the statement in the sixth Article of Religion be applied to the Christian Church.

But, even at the time of these Synods, great churchmen opposed their decisions. "St. Jerome died in 420, the year after the second Synod of Carthage. His biblical labours and learning are celebrated; he knew more about the Bible than any of his contemporaries. Cavillers he had, as have all men who bring new criticism to disturb old habits; but his orthodoxy was undoubted. His biblical publications were undertaken at a Pope's request; and the first instalment of them, a corrected Latin version of the Four Gospels, appeared in the year 383, with a prefatory letter addressed to the Pope himself. This great churchman has left us his remarks on several of the works which the African Synods were presently to include in the Canon of the New Testament, and which have stood there ever since, possessing in the eyes of Christendom a like sacredness and authority with the rest of the Canon. In reading him, we are to bear in mind the character of the speaker. It is as if Dr. Pusey, with the reputation for learning and orthodoxy which we know him to have, and commissioned, besides, by the heads of the Church to revise the Bible, were speaking of the Canon. St. Jerome, then, says of the Epistle to the Hebrews: 'The custom of the Latin Christians

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does not receive it among the Canonical Scriptures.' Of the Apocalypse he says: 'The Greek Churches use the same freedom in regard to John's Apocalypse.' Of the so-called Second Epistle of Peter he says: 'It is denied by most to be his.' Of the Epistle of James he says: 'It is asserted to have been brought out by somebody else under his name.' Of the Epistle of Jude he says: 'Inasmuch as the author appeals to the Book of Enoch, which is apocryphal, the Epistle is rejected by most.' Of the three Epistles attributed to St. John, Jerome says: 'He wrote one Epistle which is acknowledged by all churches and scholars, but the remaining two are asserted to be by John the Elder.'

"Now, all Jerome's sympathies were with what was orthodox, ecclesiastical, regular. The works on which he has here been remarking, seemed to him good and edifying; they had been much used, and had inspired attachment. The tendency in the Church was to admit them to canonicity, as the African Synods did. Jerome wished them to be admitted. He helped forward their admission by arguments in its favour, some of them not a little strained. But what we want the reader to observe is the entire upset which Jerome gives to our popular notion of the Canon of the New Testament; the notion of a number of sacred books, just so many and no more, all alike of the most indisputable authenticity, and having equal authority from the very first. It is true, they were about to get invested with this character, but through the authority of the Church, and because, while this authority was on the increase, learning and criticism, amidst the miseries of the invasions and general break-up then befalling Europe, languished and died nearly out. . . . Four hundred years after Christ, we have the last representative of biblical learning before the setting-in of medieval ignorance, we have the Dr. Pusey of his time, a great churchman, orthodox, learned, trusted, declaring without the least concealment, the

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essential difference in authority between some documents in our New Testament and others!" (Matthew Arnold.)

Proceeding to earlier times than St. Jerome's, we find great churchmen, such as Eusebius and Origen, distinctly asserting that books in our Canon were then not accepted; and these churchmen, unlike Jerome, express no desire that such books should be accepted. Not one of our four Gospels specifies the name of the writer. Interpolation and forgery of such documents was an extremely common practice of the times. St. Paul, himself, in the Second Epistle to the Thessalonians, says: "Now we beseech you, brethren that ye be not soon shaken in mind by letter as from us," thus indicating that forged epistles were extant. Tertullian mentions a detected case of forgery of Acts of Paul, authorizing a woman to baptize. Eusebius, Bishop of Cæsarea, who died A.D. 340, refers to Scriptures "put forth by the heretics in the name of the Apostles, whether as containing the Gospels of Peter and Thomas and Matthias, or those also of any others besides these, or as containing the Acts of Andrew and John and the other Apostles." The earliest explicit statement from a great churchman as to the authenticity of our Four Gospels of the Canon, is that of Irenæus, about A.D. 180. A fragment, discovered in the monastery of Bobbio, in North Italy, by an Italian antiquary, Muratori, gives similar evidence to that of Irenæus, but perhaps a few years earlier in date. This fragment is a translation into barbarous Latin of some earlier record written, probably, about A.D. 170. The fragment itself is said to be of the eighth century.

Our New Testament Canon exists simply through the consent of certain Church assemblies to accept the books as proceeding from the Apostles of Christ, or from the followers of such Apostles. These assemblies weighed the evidence then available for or against the authenticity of

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certain records, and we abide by their decision. We accept everything by authority, and that authority is manifestly against the judgment of men pre-eminent, in their times, as critics of the subject-matter. This, in a few words, is our position in respect to the New Testament Canon.

To those who desire a lucid and conclusive demonstration of the fact that all religious forms, ceremonies, and doctrines have been evolved from prehistoric beginnings, initiated by ape-like savages, we would recommend the perusal of the "Hibbert Lectures of 1891," delivered by Count Goblet D'Alviella, Professor of the History of Religions at the University of Brussels. "In the cave of Spy we can trace, through thousands upon thousands of years, savage inhabitants whose bones exhibit such an ape-like character that they have supplied a new link in the descending scale from man to the animals. Armed only with flints to defend themselves against the terrible beasts that wandered round their retreat, exposed to the rigours of such a climate as the present inhabitants of the Polar regions can scarcely endure, though supported by resources which, in comparison with those of the primitive inhabitants of Moustiers, almost represent civilization, these contemporaries of the mammoth and the cave-bear, whose energies one would have thought would have been wholly absorbed in the struggle for existence, still found time to attend to their dead, to prepare them for their future life, and to offer them objects which they might have used for themselves, but which they preferred to bestow on the dead for their use in another life." (De Puydt et Lohest, quoted by D'Alviella.) From such beginnings to the latest religious tenets of our time, the learned Hibbert lecturer, by a vast amount of evidence and the clearest logic, has established, practically as surely as to mathematical demonstration, the theory of religious evolution. No link in the chain is missing, from prehistoric axe-worship to the latest Trinitarian metaphysics.

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As surely as paleontology and biology have traced the evolution of organism, so surely have psychology, ethnography, folk-lore, philology and archæology traced from its beginnings the growth of man's conception of God. To assert that the process of evolution has now stopped in regard to religion, betrays, under the present conditions of knowledge, surpassing ignorance, disingenuousness, or irrationality. Not the combined ingenuity of all the professors of apologetics in the service of Dogma can affect the significance of the facts marshalled in cold array by the indefatigable lecturer to the Hibbert Trustees. These facts are as conclusive against the existence of any religion outside the chain of evolution as are the latest results of biological research against the existence of "free-will." Trinitarianism, the doctrines of atonement and resurrection, and future rewards and punishments, the figurative symbolism of Christian sacraments—all had their rude prototypes at the childhood of humanity. From men's brains have emanated all the links in the chain of religious evolution. Faiths have been, hitherto, subjective verifications; the time has now come for objective verification. Human emotion must henceforth submit to Fact, though Fact be the iconoclast of humanity's dearest idol!

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WEISMANNISM.

PREFACE TO RUDIMENTARY WEISMANNISM.

It is beyond the writer's purpose here to discuss the more intricate problems which Weismann has solved. Readers who desire information on such points are the people who should seriously study Weismann's writings. All we profess to do in this sketch is to afford the unscientific reader a fairly accurate *resumé* of some of the main conclusions established by the new theory. Our main concern with Weismannism, in the present volume, is the application of the doctrine to the demolition of certain religious, ethical and sociological superstitions. It is hoped that this sketch may enable the average reader to realize the scientific annihilation which has now overtaken certain conventionalities based on, or sanctioned by, the long-accepted fallacy that extraneous influences acting on the human organism may hereditarily affect the type. The vital importance to society of the complete renunciation of this fallacy will, we hope, become self-evident to the reader of this volume.

RUDIMENTARY WEISMANNISM.

CHAPTER I.

To grasp the salient points of the new theory, we must start with a fundamental conception: elements endowed with a life-principle. It has been sought to carry the conception of a life-principle into the realm of inorganic matter. This

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seems unprofitable. There is life of a sort in a stone, but this is quite distinct from the conditions of existence of a sentient being possessing powers of growth by the assimilation of food.

Weismann calls his vital elements, biophors—from two Greek words signifying bearers of life. Various prominent biologists have formulated conceptions of primitive bearers of vitality. Darwin, Spencer, Galton, Nägeli, Haeckel, have assumed the existence of primitive vital units. Their conceptions differ materially from Weismann's. De Vries has conceived vital units analogous to Weismann's. Nevertheless, these differ in important respects from Weismann's biophors. How they differ has been shown in my article (*National Reformer*, May 28th) entitled "Weismannism and its adversaries." (Chapter V.)

Every primitive cell contains biophors, which cause this cell to propagate itself by fission, or division into two cells exactly alike. This process of fission, in certain cells, continues indefinitely. These cells are, in this sense, immortal. They are called germ-cells. In other cells, there is a comparatively near limit to the duration of this process of reproduction. These cells are called somatic. They are mortal.

As stated above, primitive cells divide into two, exactly alike. This is not quite accurate although practically so, at the present stage of our examination. How cells became later endowed with the capacity of dividing into cells *dissimilar* from themselves, that is: how variation first arose, will be subsequently explained. Then, let us assume that Weismann's biophors, in some way, determine the character of every cell and its rate and limits of multiplication. How cell-multiplication determines the character of the organism is explained by another science than that under consideration, viz.: embryology.

Weismann's biophors do not fly about the organism in an indiscriminate, higgledy-piggledy manner, as do the

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pangenes of Darwin or the physiological units of Spencer. Weismann's biophors are bound by rigid laws of operation: they coalesce into several higher stages of organism, before they approximate to the conceptions of the above naturalists. Each of the primitive stages of organism occurring previous to cell-multiplication represents a complex product of evolution, but a product distinct from the later ones, which ensue in the course of the further evolution resulting in cell-agglomeration, as distinguished from mere cell-multiplication, inasmuch as these earlier stages are *unhistorical*: they are beyond the scrutiny of direct observation. Nevertheless, we are justified in assuming that the laws which decide the later stages of evolution, have operated in the earlier ones. Natural Selection has determined the evolution of the cell, as it has the evolution of the complex organism containing millions of cells. First, these biophors (living organisms, remember, with primitive likes and dislikes, and selfish to the core!) under the law of Natural Selection, combined to form a higher biological unit, called by Weismann: a determinant, because, later on in evolution, this second product must, according to Weismann's theory, be supposed to determine the evolution of the various agglomerations of cells which result in the formation of the higher structures. Complexity following simplicity, in evolution, this determinant is a more complicated organism than a biophor: it is a confederacy of biophors, fighting its own battle in the struggle for life, just as will a later product: man, composed of trillions of biophors in all the stages of evolution which have occurred between the first biophor and the first man, fight his own battle! Like man, this determinant has its periods of immaturity and maturity, its childhood and manhood. Like man, it is ultimately decomposed into its primitive elements. Only, unlike man (unless we are to believe the spiritualists who maintain that man is decomposed into his constituent "biophors," and thus begins a new activity beyond the grave), these determinants, in

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giving up their corporate existences, begin to exercise their most useful functions. Their contained biophors then swarm into the containing cell and by their activities determine the fate of this cell: whether it shall go towards the evolution of, say, an eye or a brain; whether it shall be a cell with great assimilative powers and rapid multiplication, or the reverse; in what directions its multiplication shall take place; what will be the limit to its fissional activity: in other words, the determinant at maturity impresses on the cell its specific character, which is fixed by the struggle for life of the liberated biophors.

But, in the determinant, we have not yet reached the ultimate and most complex biological structure. Two other units succeed this, before strictly historical organism, in the shape of the germ-cell, begins to energize in evolution. These two later biological units, each a living individuality, with a fixed period of existence and potentiality of development, just as is a determinant or a biophor, are called ids and idants. The latter are the final biological units. The two terms are derived from idioplasm, a term used by Nägeli to designate the specific hereditary substance. This latter term is now superseded by germplasm representing the substance containing all the elements above described.

Now, we proceed from the biological to the physiological unit: the germ-cell. This is a living organism composed of biophors, determinants, ids, and idants. It has, no doubt, been evolved, just as has each of the latter, and as has every later complex structure, under the law of natural selection. Of course, we cannot prove this fact, as regards the more primitive organisms, by the demonstrations we can apply to the later types, but we are quite justified in assuming the analogy. In cells, for the first time, differentiation becomes a physically observable process. We cannot *observe* the difference between different sorts of biophor, or even between biophors and ids. Neverthe-

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less, we can *logically* prove that a biophor is not an id, and that the latter is not an idant. I will not trouble the reader with the highly complicated process of demonstration by which Weismann establishes the necessary existence of organisms answering to his conceptions: biophors, determinants, ids and idants. Each of these must be accepted as a demonstrable reality, essential to the comprehension of the process of evolution. Physics is bound to assume the existence of an ether which is no more physically demonstrable than are the above biological elements. Science accepts ether as a reality, so it will accept as real Weismann's biological units.

The most important difference in cells, observable by man, is that between what are called germ-cells and somatic cells. Human eyes aided by the microscope can detect this difference. On the essential difference between these two sorts of cell rests the theory of heredity, by which, so the writer thinks, its discoverer will be remembered by posterity as one of the finest products of intellectual evolution known to humanity. Weismann's phenomenal powers of observation, analysis, synthesis, and deduction have given mankind the most deep-reaching truth the world has yet achieved. In the writer's opinion, this truth will ensure the greatest mental revolution of any age: it will probe the very tap-root of civilization. We have stated above that cells, at one period of evolution, became differentiated into two great classes—somatic cells and germ-cells. Now, let us see how this process of differentiation occurred. A well-known principle universally prevalent among men, also prevails among the other products of evolution. This is the principle of division of labour: the cutting up into parts of the work to be done and the allocation of each part to the agent best adapted to its performance. Thus, effort is economized. Like man, nature has special work done by special agents best adapted to it. Now, we cannot by observation verify

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this principle among biophors, but we can so verify it among cells. We infer, however, that it is as active among the former as among the latter. It occurred at some early period of evolution that two or more cells derived some advantage from clustering together, instead of, as hitherto, each following a separate career. As biophors, determinants, ids, and idants had previously benefited by union, so the combination of these former, which we call a cell, found that union was strength. However, with this union there occurred another effect—the evolution of complexity of function. Where all is absolute simplicity, there can be little diversity of function. With the new conditions of a cell-colony instead of an individual cell, there arose the possibility that one or two cells in a colony might be better able than the rest to forage for the colony—a slight variability of the component ids or even a mere difference of locality with regard to the rest—might secure the necessary conditions. As the special capacity for providing food would relieve other cells of a part of their functions, the colony, in this respect, would have an advantage over other colonies which contained no such differentiated individuals. Accordingly these differentiated colonies would preponderate in the struggle for existence: natural selection would operate as in all other similar cases.

But, it may now be asked, how came it that these cells with the specially developed nutritive faculty lost the power which they once possessed of producing a colony? When these colonies began to exist each constituent cell was a germ-cell, and, by fission, could produce another colony exactly like the one of which it was a member. We will now give Weismann's explanation of the origin of somatic cells.

Every faculty, through disuse, tends to disappear, not, let it be clearly understood, through any effect approximating to the conception of Lamarckians, not directly through disuse, but merely, because, through the inutility of the

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faculty, natural selection ceases to preserve it, by eliminating those individuals in which the faculty is least developed. Only through selection, natural or artificial, are innate faculties preserved and improved. As soon as any faculty ceases to be of utility, natural selection cannot occur, the type possessing the quality in the highest degree is no better fitted to survive, that is, to thrive, than is the type devoid of the faculty. Consequently, free mixing of the two types ensues, and the further this proceeds, the more nearly do the types tend to approach the rudimentary standard from which the particular quality originated. When once this reproductive potentiality became a matter of no importance to the cell-colony, as regards certain individuals in the colony, that colony, a corporate individuality, would not need the exercise of the reproductive power in all its component parts. Natural selection would then cease to maintain the general diffusion of this power, and would forward the principle of division of labour and specialization of function, so that the power of reproducing the entire colony, hitherto a potentiality of each member of the colony, would become lost to the somatic cells. Now, let us recapitulate a little. Weismann's primitive germ-cell is endowed with the potentiality of unlimited self-division into two similar germ-cells: it is immortal. But, do not understand this immortality to imply eternal duration. Eternity involves the assumption of no beginning or end. It is inconceivable. Life on earth had a beginning: it will have an end. All that Weismann means by the immortality of the germ-cells is that, so long as the conditions of their existence persist, these germ-cells will continue to divide into two similar living organisms. What we commonly understand by death, the phenomenon noticed in most of the creatures about us, is not the normal cessation of life as Weismann conceives it. The common phenomenon merely implies that the conditions of existence of the immortal element, the germ-

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plasm, have not been fulfilled: the potential immortality of the germ-cells becomes of no avail through the death of the mortal somatic cells. As these constitute the great bulk of the organism, their death gives us, commonly, our only idea about the phenomenon. Now we may proceed to the question: how could an originally immortal substance become converted into a mortal substance? Let us take an instance from another class of phenomena. So long as the conditions of its normal existence persist, that is, so long as it is at certain temperatures and pressures, oxygen is a gas. With temperatures and pressures suitably changed, altered conditions arise: oxygen becomes a liquid. Similarly, the conditions of protoplasmic existence may be so altered that a limited, instead of an unlimited period may be allotted to the organism, during which, its processes of fission, growth by assimilation, and refission may continue. In a cell—as distinguished from a colony of cells such as we have been considering—a radical abrogation of conditions might lead to the death of its hitherto potentially immortal biophors, just as, in the agglomeration of cells we call a man, the death of the immensely preponderating bulk of somatic cells causes the death of the hitherto potentially immortal germ-cells; or, to take a further instance, this time from an entirely different source, just as the "death" of the piston-rod of a locomotive destroys the "life" of the locomotive and of its "immortal" (so long as their conditions of "life" persist) parts. We may now form some reasonable conception of why and how somatic cells have lost the power of unlimited reproduction.

CHAPTER II.

In the preceding chapter we enunciated the proposition that Weismann's "immortality" did not imply eternity of

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duration, but merely the potentiality of certain primitive organisms, so long as the necessary conditions persisted, to propagate themselves to a practically unlimited extent. The difference between the immortality of these primitive types and the mortality of later ones, we must understand to be: that the latter have only a limited power of self-propagation. Now, some acute critic may here exclaim: this is a distinction without a difference; your immortality is practically the same thing as your mortality. Your "mortal," like your "immortal" cells are immortal so long as the conditions of their existence persist. In answer to such a critic, we reply: granted that this is the case, we can, nevertheless, demonstrate that, in certain cells, the reproductive process is practically perpetual, while, in others, its limits are readily discernible, as occurring after a comparatively small number of generations. The one is an historical, the other, an unhistorical process. Life, in the wide sense of the existence of organic types on the earth, is perpetuated by the unhistorical process; life, in the narrow sense of the existence of individual organism, is determined by the historical process.

Mr. Herbert Spencer, in the *Contemporary Review* for May, 1893 (page 752), advanced what, superficially viewed, seems a forcible plea against Weismann's definition of the immortality of germ-cells. Mr. Spencer writes: "The mortality of the somatic cells constituting the mass of the human body is, according to Professor Weismann, shown by the decline and final cessation of cell-multiplication in its various organs. Suppose we apply this test to all the organs: not to those only in which there continually arise bile-cells, epithelium-cells, &c., but to those also in which there arise reproductive cells. What do we find? That the multiplication of these last comes to an end long before the multiplication of the first. In a healthy woman, the cells which constitute the various active tissues of the body continue to grow and multiply for many years after the germ-

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cells have died out. If similarly measured, then, those cells of the last class prove to be more mortal than those of the first." Now, in such a case as the above, we shall see the weakness of the contention, if we remember that the immortality of these germ-cells depends, among other things, on the possibility of their obtaining nutriment. This, in the human organism, they obtain from certain adjacent somatic cells. But, suppose that these somatic cells die sooner than the greater part of the organism. Then, there would be no nutriment for the germ-cells which would die, not because they had become "mortal," but because the conditions of their existence were lacking: they would die accidentally. Moreover, Mr. Spencer seems to overlook that his instance although innocuous to Weismannism, is very hurtful to his own theory of a universal diffusion through the body, of the elements of reproduction. How can he on the hypothesis that germ and somatic cells are alike, account for the cessation of reproductive energy in a healthy woman?

Hitherto, we have mainly been considering the most primitive form of reproductive energy; the unlimited division into two, of one-cell organisms. (It must be understood that we here refer to the most primitive *historical* form, not to the unhistorical processes of evolution resulting in determinants, ids, and idants. We have already stated that, although these one-cell organisms are apparently homogeneous, they can, by logical process, be shown to contain a number of diverse individualities called biophors in various states of combination into still higher types called determinants, ids, and idants.) Now, this process of division, in one-cell organisms, although adequate to perpetuate such organisms, could produce no great typical variation, every product of division would be like every other product. Variation is the aim of evolution, so, in time, as has already been explained, it occurred that a number of these primitive one-cell beings coalesced into a colony, and that some of them became differentiated into cells with only a limited

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power of reproduction, inasmuch as they suffered normal death and were incapable of doing what had hitherto been achieved by every member of the colony: reproducing a new colony exactly like the old one.

We have, through the differentiation into somatic and reproductive elements of the organism, accounted for the evolution of primitive historical variation. But this, in itself, is very far from giving us an adequate idea of those processes by which variation, as we commonly understand it, has been achieved. We require more elaborate machinery than the mere differentiation into somatic and germ-cells, to account for the highly complicated forms of life we see around us. In such an inchoate colony of cells as we have pictured to the reader it is hard to conceive at once the evolutionary basis of the polype and of the elephant; of cilia and flagella, mere primitive organs of motion, and of the brain of a Shakespeare.

Let us now consider the great feat of evolution: the achievement of sexual reproduction, and let the reader bear in mind that this term "sexual" involves one of the gravest fallacies which have ever deceived the biologist, inasmuch as it implies a difference in essence, when no such difference exists, between the "male" (spermatozoa) and "female" (ova) elements. It is demonstrated empirically and logically that the "male" reproductive principle is essentially identical with the "female" reproductive principle. An experiment which proved this was the production of an individual organism from an egg "fertilized" with two spermatozoa instead of with its own nucleus and one spermatozoon. (See Boveri's experiment referred to in Chapters XII. and XIII.)

Amphimixis, or sexual reproduction, has only slight significance in respect to multiplication; in fact, it generally means the reverse: two cells, the spermatozoon and the ovum, fusing into one. The old "rejuvenescence" theory inferring, from sexual union, some mysterious invigorant

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affording a life-principle by which alone the type could be preserved, is riddled through and through, with argument and illustration, by Weismann. He shows that, as parthenogenetic (non-sexual) reproduction, which, in many species, prevails for a great number of generations, to be eventually succeeded by sexual reproduction, is able to ensure a vastly increased *rate* of multiplication, sexual reproduction cannot be essential to the continuance of the type. "Thus, let us call to mind *Phylloxera* and its allies, in which many purely parthenogenetic generations follow one another every year and bring about an immense increase of individuals, to be finally succeeded by a single sexual generation of insignificant wingless males and females without mouth appendages, which have nothing to do but pair immediately after birth to produce the fertilized ova. Thus, sexual reproduction is retained in spite of the fact that no increase, but rather a decrease, in the number of individuals is, in these cases, brought about by its means, just as in the conjugation of the lower unicellular organisms." (Weismann.)

The true significance of sexual reproduction is not the multiplication of individuals: what, then, is its significance? Sexual reproduction is demonstrated by Weismann to have come into the world to ensure an illimitable typical diversity. Only through amphimixis is this possible. It is beyond our purpose here to discuss in detail the method by which Weismann has established his proposition. It will suffice to afford the reader an intelligible outline of the vast scientific fabric which Weismann has built up, to explain typical diversity.

The earliest mode of reproduction was, as already explained, division into two of a one-cell organism. This division into two, in the "unhistorical" period of evolution, needed no special mechanism to ensure its occurrence: the parent organism being homogeneous, however it divided, the result would be a duplication of the original. When,

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however, certain agglomerations of biophors became differentiated by extraneous influence, which, at that period of evolution, could hereditarily affect what was practically undifferentiated protoplasm, a special mechanism became needful to ensure by division an equal distribution to each product of division, of the typical characteristics. This mechanism was achieved by the formation of the nucleus, which every existing cell possesses, those earlier types without nucleus having become extinct. This nucleus contains all the biophors necessary to the formation of a complete individual. It is provided with a membrane through which the biophors escape into the cell whose growth they control.

In its simplest form, amphimixis consists of the entire fusion of two cells, including their nuclei. In complex organism, containing multitudes of cells, complete fusion of the body becomes, of course, impossible. The nuclei—or rather, as will be later shown, half the nucleus of each parent, in such forms of organism, combine. In the higher organisms, these nuclei consist of what are called nuclear rods, or idants, easily recognizable under the microscope. As before explained, these idants consist of organized combinations of biophors, called ids (each id contains all the specific hereditary qualities necessary to the formation of an individual) and determinants (a determinant is part of an id, and when mature, controls, by allowing its contained biophors to escape, the development of its special cell or group of cells independently variable throughout all future stages of organic development. Such an independent group are the blood corpuscles which being undifferentiated may be controlled, though millions in number, by a single determinant).

Now, the reader may observe, this sounds comprehensible and credible, but what demonstration, what "sign," can Weismann give us, as ordinary men to whom his highly technical ratiocination is "double Dutch," that the nucleus

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really does control the cell? To answer such a question as the above, we will, first, again refer the reader to Boveri's experiment mentioned above. This experiment affords *ocular* demonstration that a certain animal's egg deprived of its nucleus and impregnated with two nuclei from another species of animal, generates an individual of the latter species. If the nucleus were not the type-determining factor, it is manifest that no such result as this could ensue. There would either be no reproduction at all, or else the offspring would be of the same species as the egg, not as the two foreign nuclei. Further, as the two foreign nuclei were males, this experiment offers ocular demonstration that there is no essential difference between the male and female reproductive principle. Here is another "sign." Strasburger "proved that the nucleus of the sperm-cell (the pollen-tube) enters the embryo-sac and fuses with the nucleus of the egg-cell" (in Phanerogams); "at the same time he came to the conclusion that the *body* of the sperm-cell does not pass into the embryo-sac." (Weismann.) Here we have ocular demonstration that the nucleus only of the sperm-cell (male) fuses with the nucleus of the ovum (female). Consequently, there can be nothing but the nucleus of a male cell, putting aside the female cell, here engaged in the work of reproduction. We will now afford a few further "signs" to the biologically ignorant sceptic. Every species of animal has a certain number—no more, no less—of idants in each sperm and egg-cell (male and female). The numbers of these idants natural to many species, have been ocularly verified. The biologist recognizes them as surely as he recognizes his own house. In man they have not, so far, been ascertained. Now they are on the "scent," depend upon it, biologists will identify the number of idants natural to man. A certain sort of *Ascaris* possesses only 4 idants. Some Mollusca possess 32. "In the first place, in no other living being have so small a number of idants been found as in

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this variety of *Ascaris megalocephala*. Even so few as 4 idants occur but rarely; and in the nearest relatives of the species—for instance, in *Ascaris lumbricoides*—12 idants are found; in other Nematodes, according to Carney, there are 8 to 16; in Sagitta, according to Boveri, 18; and the same number in Echinus; in a Medusa, *Tiara*, 28; and in three different genera of molluscs, 32. *Ascaris m. univalvens* is in this respect an exception, and should perhaps be dealt with from this point of view, especially as the variety *bivalvens*, with 4 idants, appears to be the more common." (Weismann.) It will now probably be acknowledged that we have afforded a "sign" that "idants" are hard facts, like, say, a tough beef-steak!

CHAPTER III.

In the preceding chapter, we referred to sexual reproduction as the prime means by which has been achieved the variation of individual character manifest throughout organism. To enable the reader to understand how this effect could ensue from sexual reproduction, we must direct his attention to some of its main facts. It has been already stated that the number of idants peculiar to the egg- and sperm-cells of each species of animal is fixed. Throughout all the stages of development, from the ovum and spermatozoon to the fully-formed organism, the number of idants is constant in each cell; nevertheless, in no cell except the original impregnated ovum, are all the hereditary elements, or determinants, present in each idant. From the first splitting or segmentation of the egg-nucleus to the segmentation of the ultimate cells of the organism, there is a continual throwing-off from each cell-generation of those determinants which must disintegrate into their constituent biophors to achieve the particular stage of development, or ontogeny. Consequently, in the ultimate

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idants of the ultimate cells there will remain only one of the thousands of determinants with which each idant of the egg-nucleus started the development of the embryo. The reason why no cell except the germ-cell can produce a complete individual is, accordingly, that no cell except the germ-cell contains all the necessary determinants. This is also the reason why no somatic cell can reproduce or influence a preceding stage of development, but can only evolve the stage succeeding itself. The phenomena of budding and regeneration of lost parts, as in a polype, are only apparent contradictions of this proposition. Such phenomena are dependent on the existence, in particular cells, of latent accessory germ-plasm besides the ordinary somatic plasm. To discuss such details would open up recondite points unessential to our main thesis and calculated to bewilder the ordinary reader.

In the egg and sperm mother-cells (by these terms are meant immature germ-cells of the female and male organisms) before coalescence of the nucleus of the sperm with the nucleus of the egg-cell can take place for the purpose of reproduction, each idant, or nuclear spindle (as already explained, an idant is an organism containing a definite number of ids, each of which, again, contains a definite number of determinants), splits longitudinally into two equal parts which contain similar arrangements of ids as existed in the parent idant. There are thus in each sperm and egg mother-cell, at this stage of development, twice as many idants and their contained hereditary elements as existed before the process of doubling. Now, it is necessary that only the fixed number of idants peculiar to the species shall reappear in each fertilized egg-cell. But, there has been, in the sperm and egg mother-cells, a doubling of idants; consequently there must be a reduction before the number of idants normal to the species can co-operate in the egg-cell for reproduction.

This reduction is obtained by a process observed in all

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classes of *metazoa* (multicellular organisms) which procreate by the sexual method. This process is called "reducing division." In the egg-cell, it results in the extrusion at two different times of two so-called polar bodies (or, rather, three, the first body dividing into two after extrusion). Each of these polar bodies contains half as many idants as existed in the mother-cell. (It may be noted that these polar bodies of the egg-cell are really germ-cells which, being outside the egg, die through lack of nutriment. That they are thus eliminated only to die, shows an atavistic tendency towards a more primitive form of reproduction, when each product of division was capable of development into an organism.) The issue of this process of division is that the one germ-cell within the egg contains, like the unproductive cells without, one half the original number of idants, and that the egg-nucleus is then mature, or ready to receive the sperm (male) nucleus. A similar process of division in the latter ensures that half its original number of idants shall enter the egg-cell which then, as a fertilized cell, contains the number of idants normal to the species. Then, embryogeny commences.

It will now be necessary to revert to earlier statements. It was stated in the first chapter, that an idant contained a certain number of ids, and that an id was composed of a certain number of determinants. The id is thus a more primitive structure than an idant, and a determinant is a more primitive structure than an id. Each is a complex structure complete in itself, with a normal period of growth and disintegration. It will accordingly be understood that an id, which contains neither more nor less than the number of determinants essential to the building up of an organism, cannot be divided without invalidating its efficiency as a developmental factor. An idant, on the contrary, containing a number of ids, may be cut up and yet possess the power to evolve a complete organism. On this account we must consider an id to be the fundamental biological con-

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stituent of a multicellular organism: one id contains all the hereditary elements necessary to the formation of such an organism; less than an id could not produce such an organism. Now, when first sexual reproduction appeared, the two individual cells coalescing to that end, would each contain an id. In the next generation, the nucleus of the germ-plasm would contain two ids, those of the father and mother. Assuming that this offspring procreated by the sexual method with another organism similarly circumstanced, the germ-plasm of the ovum would then contain four ids. It is essential that, at each sexual act, a number of hereditary elements of the father equal to those of the mother shall enter the egg. Then, it is evident that at some period after the initiation of sexual reproduction it would become necessary to halve the ids in the egg-cell, or that cell could not receive the necessary number of ids from the sperm-cell. That period would arrive when each id had become reduced to the smallest bulk compatible with its existence as an id, and corollarily, when the cells of each parent contained the greatest variety of ids possible to the species. The following statement of a supposititious case will render clear this point:—

Assumed number of ids possible to the species, 32.

MALE.	FEMALE.	OFFSPRING.
1 id	1 id	2 ids
2 ids	2 ids	4 ids
4 ids	4 ids	8 ids
8 ids	8 ids	16 ids
16 ids	16 ids	32 ids
32 ids	32 ids	64 ids

In the sixth generation the offspring would have 64 ids, or double the possible number, unless there had been the previous reduction to half, in each parent cell. Of course, the above number of assumed possible ids is entirely arbitrary. Sexual reproduction having now, in all types so

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procreating, persisted for thousands of generations, every germ-cell of a complex sexual organism must now possess its maximum number of ids which, in even the simplest germ-plasm, must number many thousands. Thus, Weismannism explains the origin of the process of the reduction to half, of the hereditary constituents, before each act of sexual reproduction.

We may now proceed to explain the purpose of the process of doubling of the idants which takes place before the "reducing division." If merely a reduction to one-half of the ancestral units, or ids, were required, it is evident that this might be achieved by one division, instead of a doubling and two divisions. On the other hand, it must be evident that, the greater the variety of combinations there are co-operating for reproduction, the greater will be the variability of successive offspring, and, conversely, the more varying units there are in a germ-plasm, the greater will be the possible variety of combinations. Weismann infers that the doubling of the units occurs to increase the number of possible combinations, and thus ensure greater variability in successive offspring. Let us assume a case, again entirely arbitrary. Suppose, in a maternal plasm, there are two units, A and B; in a paternal plasm, also two, C and D. From this arrangement the following combinations could arise: A and B, C and D, A and C, B and D, A and D, B and C, in all six. But, if each of these units is doubled, before halving, the number of possible combinations is ten. In other words, ten kinds of eggs and spermatozoa would be produced by the female and male of the species to which such an arrangement was normal. Again, any one of such ten spermatozoa and ten ova might meet in procreation. Hence, ten times ten, or one hundred differentiated children might proceed from these parents. The doubling thus ensures a larger number of possible combinations—practically an infinite number, as the parental units are in every complex type much more numerous than is above assumed. On the

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variability thus achieved by the doubling and sexual reproduction, natural selection later operates, and thus has arisen that immeasurable diversity of organism which peoples the earth. We see that, under the condition of sexual reproduction, each child of the same parents receives a varying combination of ancestral plasms derived from the progenitors of such parents, and that the repetition in any two children of the same hereditary combinations is rendered practically impossible. Even in the case of twins issuing from the union of one ovum with one spermatozoon, there must always exist minute differences, inappreciable to ordinary observation. Though such twins issue from the idants of the same egg and spermatozoon, such idants practically always contain different arrangements of ids, which must affect the development of even "identical" twins.

We will now glance at another phase of Weismannism: the theory of "The continuity of the germ-plasm." By this is meant that a part of the germ-plasm, resulting in the ovum from the admixture previously described of its ancestrally derived hereditary units with those of the spermatozoon, is unused in embryogeny, and is bodily transmitted, in a latent state, to the embryo, to be subsequently used by the adult organism in procreation, and again transmitted to a later embryo. (Of course, this latent germ-plasm assimilates food and grows.) It will thus be seen that the offspring can only transmit the germ-plasm which that offspring has derived from its parents. This is the essence of Weismannism. Hence, no products of *after*-development can be hereditarily transmitted: *only the latent germ-plasm* (which, itself, is absolutely unaffected by any influence acting on the soma, or body, which contains this germ-plasm and originated from it), *with nothing but its original hereditary potentialities*, can be transmitted from parent to child. The proofs that this is the case are offered by Weismann in such overwhelming cogency that the generality of scientists no longer hesitate to accept Weismann's theory, in this respect, as a verified

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law of nature. Only unscientific doctrinaires, and a very few scientists wedded to their own hypotheses, longer question the validity of the doctrine of "The continuity of the germ-plasm." However, for the reader who likes to judge independently, it may be useful to here glance at one or two proofs of the truth of Weismann's theory. We will first refer the reader to our articles *re* Mr. Spencer, and to the controversy in the *National Reformer*. The experiments described and the arguments advanced therein will, we trust, be considered conclusive against the possibility that extraneous influence can, through the organism, affect the germ-plasm. Again, as children commonly resemble one or both of their parents, and as it is impossible that the body of the parents can affect the germ-plasm, it is evident that nothing but this germ-plasm is available to give character to the child. When the whole bodies of parents coalesced, as in primitive conjugation of two cells, to produce offspring, no special machinery would be needed to transmit hereditary character; but, in man and other complex types, as the bodies cannot coalesce, some special machinery becomes essential. The nuclei of the egg- and sperm-cells constitute this machinery. Again, Weismann's theory, in its main propositions, accords with all the observed facts. What an immense number of facts have been accumulated by biologists can only be realized from the study of such writings as Weismann's. Only now are men beginning to perceive the vast importance of that study of the infinitely little at which humorous writers were, at one time, glad to cast the shafts of their ridicule. Only now are we beginning to discern that those old German beetle-enthusiasts were not the "crackpots" we supposed, but that they were wary hunters on the track of a factor destined to probe the root of social evolution!

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SPENCER OR WEISMANN?*

CHAPTER IV.

THE gist of Mr. Spencer's argument, in the *Contemporary Review* for February and March, seems to depend on the supposed existence of a fine protoplasmic reticulum, or network, connecting all the parts, reproductive and somatic, from the time the organism exists as an egg-cell, and persisting through all subsequent ontogenetic stages. Mr. Spencer argues to a movement of protoplasmic molecules to the reproductive centres, and to a consequent possibility that extraneous influences, primarily affecting the periphery, may be transmitted to the centre, thus ensuring hereditary transmission to the soma of the succeeding organism. This approximates to the gemmule theory of Darwin, which most contemporary biologists reject.

Weismann, in controverting this line of argument, observes:

"At first sight this [gemmule] hypothesis seems to be quite reasonable. It is not only conceivable that particles might proceed from the somatic to the reproductive cells, but the very nutrition of the latter at the expense of the former is a demonstration that such a passage actually takes place. But a closer examination reveals immense difficulties. In the first place, the molecules of the body devoured are never simply added to those of the feeding individual without undergoing any change, but as far as we know they are really assimilated, that is, converted into the molecules of the latter. We cannot, therefore, gain much by assuming that a number of molecules can pass from the growing somatic cells into the growing reproductive cells, and can be deposited unchanged in the latter, so that at their next division the molecules are separated to become the somatic cells of the following generation. How can such a process be conceivable,

* The above appeared in the *National Reformer*, April 30th, 1893.

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when the colony becomes more complex, when the number of somatic cells becomes so large that they surround the reproductive cells with many layers, and when at the same time, by an increasing division of labour, a great number of different tissues and cells are produced, all of which must originate *de novo* from a single reproductive cell? Each of these various elements must, *ex hypothesi*, give up certain molecules to the reproductive cells; hence those which are in immediate contact with the latter would obviously possess an advantage over those which are more remote. If, then, any somatic cell must send the same number of molecules to each reproductive cell—or, more precisely, they must give up as many molecules as would correspond to the number of the kind of cell in question found in the mature organism—we are compelled to suspend all known physical and physiological conceptions, and must make the entirely gratuitous assumption of an affinity on the part of the molecules for the reproductive cells. Even if we admit the existence of this affinity, its origin and means of control remain perfectly unintelligible if we suppose that it has arisen from the differentiation of the complete colony. An unknown controlling force must be added to this mysterious arrangement, in order to marshal the molecules which enter the reproductive cell in such a manner that their arrangement corresponds with the order in which they must emerge as cells at a later period. In short, we become lost in unfounded hypotheses."

Assuming that extraneous influence (that is, influence apart from spontaneous variation arising from re-arrangement of elements in the reproductive idioplasm) could react through the soma on the reproductive nucleus, it could only so react in an almost imperceptible manner during each generation. This is not at all analogous with the assumed illustrations (specifically examined and disproved by, among others, Mr. Platt Ball and Weismann

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himself) of use-inheritance, whereby *strong* differences are supposed to be *immediately* transmitted. To assume that true heredity is manifested in such a case as that of the quagga markings instanced by Mr. Spencer, is to assume something apparently incomprehensible and directly opposed to all the latest evidence.

Is it not probable, assuming as fact such reversions as those instanced by Mr. Spencer, that they are merely transitory effects quite distinct from true heredity, and akin to what Mr. Platt Ball designates quasi-inheritance? Could not such effects be produced by certain male-nuclei failing to reach female-nuclei, yet retaining in the ovaries the power to transiently affect the germ-plasm by contact (akin to infection by microbes), without altering the elemental structure of the reproductive idioplasm through which alone heredity is established?

But, assuming that such reversion as that now advanced by Mr. Spencer is an instance of true heredity, is the effect of this mingling of plasms in any way comparable with, say, the transmission of the effects of an athlete's exercise to his posterity? This is the sort of transmission with which society is concerned! It is altogether of a different character from the quagga marking. Can we imagine any means by which peripheral alteration could react backwards through each separate grade of cell-development, so as to produce by normal stages, *de novo*, a succession of changes culminating, at the end of numberless series, in the identical peripheral effect visible in the parent athlete? Remember we can only go backward by the same series of steps we have used in progressing: we cannot skip from a last to a first, from a first to a last stage. This assumed transfer must be, not of the special effect apparent in the peripheral tissue of the parent athlete, but of such a modification of the effect as will so influence the primary state of the reproductive element that each ensuing cell-generation shall transmit its due

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proportion of the new influence, the totality of which shall produce in the offspring the identical ultimate effect witnessed in the parent.

To form any coherent conception of the method of such a process of inversion and progression is impossible to average intellect.

One cell-generation can only produce its pre-ordained successor. The doctrine affirming the transmission of acquired qualities assumes the possibility of a peripheral change being at once manifested hereditarily. All the laborious steps by which cell-generation after cell-generation has proceeded to the building-up of the organism, are thus ignored.

Let us examine the quagga-markings case by the light of another case. Here are the main facts of the former. A mare is put to a quagga. Subsequently, the same mare is put to a horse. The later issue, in certain respects, resembles the quagga.

According to Mr. Spencer, we are to suppose that this foreign reproductive element introduced into the tissues of the mare, has hereditarily affected the subsequent normally begotten issue, this effect occurring through the diffusion by the circulatory activity of the foreign element. Now, if this supposititious effect is manifested under the abnormal circumstances adverted to, we may assume that under normal circumstances it will be intensified. In other words, we may assume that a comparatively enormous mass of normal reproductive element will, in the case of procreation, immediately resulting from this element, as distinguished from procreation assumed to be indirectly affected by a foreign element introduced at a previous reproductive act, affect the type more powerfully than will a minute portion of such foreign element. Let us see whether observed phenomena confirm this assumption.

Let us glance at another case:

"If the eggs of *Echinus microtuberculatus, artificially deprived of their nuclei,*" (italics writer's) "*be fertilised, not*

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with the spermatozoa of their own species, but with those of another, Sphaerechinus granularis, larvae are developed, with the true character of the latter species only—that is to say, *nothing is inherited from the mother, but everything from the father.*" (Weismann.)

How came this relatively minute foreign interloper to *annihilate* its relatively enormous victim? What has become of this (on the assumption of Mr. Spencer) relatively enormous preponderating influence towards the evolution of *E. microtuberculatus?* We have, on the hypothesis of Mr. Spencer, the soma of thousands of generations of a certain animal engaged in fixing a type. We have this soma persisting in the egg-cell, yet, under the above circumstances, for all the effect it has on the coming type, this soma might be non-existent. It is practically annihilated. It seems impossible to explain the facts of heredity by any hypothesis which attributes to the soma a continuity with the reproductive idioplasm.

We must acknowledge demarcation of the reproductive from the somatic elements, or abandon the attempt to render intelligible the process of hereditary transmission.

Let us see how Weismann explains this apparent anomaly of a minute element revolutionising the developmental tendency of a comparatively great mass of living matter.

Weismann tells us that not the whole of the germ-cell is composed of hereditary principle. Only a small portion, called the nuclear idioplasm, controls the typical development of the series of cells which are to form the multicellular organism. Take away this nuclear idioplasm, the rest of the cell, in a developmental sense, is indifferent. What more striking proof of the correctness of this theory could be afforded than that the elimination of such nuclear substance ensures the very consequence required by the theory and explicable by no other hypothesis? Surely this is demonstrative evidence quite outside mere subjective ratiocination! It is hardly possible to demonstrate that no extraneous influence can, under any circumstances, affect

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the type. But it is quite possible to prove to demonstration that such effect is directly opposed to the fundamental characteristics of reproductive energy.

NOTE.—Since writing the foregoing, the writer has had an opportunity of glancing at the contents of Weismann's new work, the English translation of which is entitled "The Germ-plasm." In referring specifically to the quagga incident, mentioned by Mr. Spencer, and to another similar case, Weismann observes:

"Both the above-mentioned cases are not so conclusive as they appear to be at first sight. A drawing by Agasse of the foal possessing the characters of the quagga is to be seen at the Royal College of Surgeons in London, and shows indistinct dark stripes on the neck, withers, and legs. Similar stripes are, however, not very uncommon on purely bred foals, and ordinarily disappear as the animal grows older. No further resemblance to the quagga can, however, be detected in these pictures. Experienced breeders like Settegast and Kühn of Halle although they have frequently crossed various domestic animals, have never observed an instance of it. Such cases could only be accounted for by supposing the spermatozoa had reached the ovary after the first sexual union had occurred, and had penetrated into certain ova which were still immature."

WEISMANNISM AND ITS ADVERSARIES.*

CHAPTER V.

THE great distinction between Darwinians and Weismannites is that the former assume that they are at the root of the question of heredity when they are merely examining the trunk. From their point of view it is sufficient if they can show that certain processes which

* The above appeared in the *National Reformer*, May 28th, 1893.

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they call selection, cessation of selection, reversal of selection, acting on multicellular organisms, afford a reasonable explanation of the cause of typical diversity.

Now, Weismannites maintain that the basis of heredity lies altogether deeper than influences affecting multicellular organism. Such selective processes, operating at a comparatively late stage of evolution, do not *establish* heredity; this was established before complex organism existed. What these later processes do is merely to discriminate between heredities already established: to select those products of heredity best suited to their environment and to eliminate other products less completely adapted to their surroundings. Heredity has thus done its main work before these selective processes, as discussed by Darwinians, begin to energise.

Nevertheless, processes of selection and rejection which are demonstrably able to determine what types of complex organism shall persist, are likewise probably competent to decide the predominance of certain true factors of heredity (character-determining components of one-cell organisms). So soon as these monads have coalesced into complex organism, primitive selection has done its work, and heredity in respect to this organism is established. Then begins the Darwinian process; the eliminative as distinguished from the constructive process of typification. The prime factors of heredity (the "determinants" of the "ids") are entirely unaffected by this later process; therefore we can base no theory of heredity on it.

At the end of his article entitled "Mr. Spencer on 'Natural Selection'", in the *Contemporary Review* for April, Professor Romanes remarks: "Therefore, even if by means of their new theory of heredity or otherwise, the Neo-Darwinians should ever be able to disprove the possibility of use-inheritance, I should be driven to adopt the belief of Asa Gray, Nägeli, Virchow, and not a few other naturalists—the belief, I mean, that there is in nature

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some hitherto unknown principle of adaptive modification, which is at present almost as unsuspected as was the principle of Natural Selection some half century ago." According to Weismannism, there is no need to assume any principle other than Natural Selection as adequate to explain all adaptation. But, *behind* Natural Selection, is the Inscrutable which constituted that law the all-sufficient factor.

The writer believes that, the nearer we approach ultimate phenomena, the more decisively will scientists be compelled to avow a mystery impenetrable by human intellect: that the greater the advance in empiricism, the sooner will the "Supernatural of Science" become manifest.

Neo-Lamarckians, like Darwinians, start from a too recent phase of evolution in attempting to maintain a theory that peripheral changes may be tantamount to re-arrangement of the factors of heredity, and thus establish a new heredity. They will ignore this one fact which vitiates all their processes of subjective speculation; it is *empirically* proved that removal of the reproductive nucleus of the germ-cell renders the rest of the cell absolutely inert as a developmental agent (see Boveri's experiment on *Echinus*, referred to in the previous chapter). This cuts away to demonstration the basis on which rest all the attempts to prove transmission in *metazoa* of the effects of use and disuse. These can only affect the somatic elements, and these elements are entirely distinct from the factors of heredity. All the supposititious transmissions from parent to child adduced as evidence by Lamarckians must now be accounted for, where they cannot be disproved, as resulting from influence other than that of heredity. By no conceivable means could the reproductive nucleus be affected by use and disuse, and only by influencing the reproductive nucleus can heredity be affected.

The scientist, like the theologian, dearly loves his theory. Some of the strongest scientific intellect of the day is now defending its doomed fallacy with all the impotent intensity

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of a Newman. Partisanship is as rampant in science as in politics or religion. Probably less evidence than is now available against Lamarck would induce his eminent English disciples to renounce their opinions, say, on the Irish question. The greatest enemy of truth is sentiment. Unless anti-Weismannites can demolish evidence such as the above, proving the exclusive hereditary influence of the nucleus, it seems a waste of effort to hash up old arguments respecting mutilations, degeneration of tissue, use and disuse. The only really effective way to resuscitate the old doctrine is to demonstrate that the soma of the denucleated ovum is capable of development. The reverse has been proved experimentally by extirpating the nucleus of an ovum and fertilizing with spermatozoa of another species of animal, thus causing the egg to develop an embryo of the new species. Now let the anti-Weismannite denucleate an egg and prove its capacity, without nucleus, to become an embryo. After that is done, it will be profitable to reconsider the argumental side of the question, Are the effects of use and disuse hereditarily transmissible?

In summing up his *pros* and *cons*, Dr. Romanes writes as follows, in the article previously referred to: "How, then, does the matter stand when we pass from these merely antecedent grounds of logic, to the real battlefield of facts? Here the questions are three in number. 1. Do we meet with facts in organic nature which cannot be explained by the theory of natural selection? 2. Are any of these facts capable of being explained by the theory of use-inheritance? And 3. Is there any further evidence in favour of this theory? Dr. Romanes, in a rather hesitative manner, says that a provisionally affirmative answer must be given to each of these questions. Weismannites would probably like to have the professor's answers to the following:—Does or does not Boveri's experiment, as evidence against use-inheritance, outweigh all the mere theory advanced in its favour? And, in the face of this

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experiment, is any pangenetical (Darwinian) hypothesis longer admissible as an explanation of hereditary transmission? Further, as such long-continued practices as circumcision, docking animals' tails and ears, shaving the human chin, shearing sheep, plucking geese's quills, denuding eider-ducks of down, have had no appreciable hereditary effect on organism; as scores of generations of talking and writing humanity have not afforded a single talking or writing infant; as we have to learn every acquirement which thousands of ancestors have been practising the greater part of their lives,—in the face of facts such as these, what can "use-inheritance" explain, and where is the evidence in its favour?

No more trenchant exposure of the untenability of the doctrine of use-inheritance has been written, so far as I am aware, than by Mr. Platt Ball in his work entitled "The effects of use and disuse" (Macmillan). He thus sums up his case: "Let us consider some of the features of this alleged factor of evolution, seeing that it is henceforth to be our principal means of securing the improvement of our species and our continued adaptation to the changing conditions of a progressive civilisation. It is curiously uncertain and irregular in its action. It diminishes or abolishes some structures (such as eyes or jaws) without correspondingly diminishing or abolishing other equally disused and closely related parts (such as teeth, or eye-stalks). It thickens ducks' leg-bones, while allowing them to shorten. It shortens the disused wing-bones of ducks and the leg-bones of rabbits, while allowing them to thicken; and yet in other cases it greatly reduces the thickness of bones without shortening them. It transmits tameness most powerfully in an animal which usually cannot acquire it. It aids in webbing the feet of water-dogs, but fails to web the feet of the water-hen or to remove the web in the feet of upland geese. It lengthens legs because they are used in supporting the

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body, and shortens arms because they are used in pulling. It enlarges hands long before they are used, and thickens soles long before the time for walking on them. At the same time, as if by an oversight, it so delays its transmission of the habit of walking on these thickened soles, that the gradual and tedious acquisition of the non-transmitted habit costs the infant much time and trouble, and often some pain and danger. Yet where aided by natural selection, as with chickens and foals, it transmits the habit in wonderful perfection and at a remarkably early date. It transmits new paces in horses in a single generation, but fails to perpetuate the songs of birds. It modifies offspring like parents, and yet allows the formation of two reproductive types in plants, and of two or more types widely different from the parents in some of the higher insects. It is said to be indispensable for the co-ordinated development of man and the giraffe and the elk, but appears to be unnecessary for the evolution and the maintenance of wonderful structures and habits and instincts in a thousand species of ants and bees and termites. It is the only possible means of complex evolution and adaptation of co-operative parts, and yet in Mr. Spencer's most representative case it renders such important parts as teeth and jaws unsuited for each other, and is said to ruin the teeth by the consequent overcrowding and decay. It only seems to act usefully and healthily and regularly in quarters where it can least easily be distinguished from other more powerful and demonstrable factors of evolution. So little does it care to display its powers where they would be easily verifiable as well as useful, that practical breeders ignore it. So slight is its independent power that it seems to allow natural selection or sexual selection or artificial selection to modify organisms in sheer defiance of its utmost opposition, just as readily as they modify organisms in other directions with its utmost help."

As all the above statements have been previously proved

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in detail, it will be seen that Mr. Platt Ball has pretty effectually disposed of use-inheritance. We have now, through Weismann, overwhelming direct evidence, from quite a different standpoint, that use-inheritance is a physical impossibility. Hence we may ask, as the final question of most public interest: How long will the old fallacy continue to influence us in the practical concerns of life? How long shall we cling to the superstition that we are going to regenerate humanity by our Board Schools, our new "moralities," our anti-this-that-and-the-other propagandas?

* * * * * *

Mr. Spencer, in his last contribution to the *Contemporary Review* (May number), argues, from the facts of propagation by cuttings and buds, that somatic cells are reproductive cells, and that consequently Weismann's germ-cells are mythical. He instances, among other plants reproduced asexually through many generations, a plant called *Eloidea Canadensis*, "introduced no one knows how, and which now everywhere infests ponds, canals, and small slow rivers. The plant is dicœcious, and only the female exists here. Beyond all question, therefore, this vast progeny of the first slip or fragment introduced *is constituted entirely of somatic cells* (Italics writer's). Hence, as far as we can judge, these somatic cells are immortal in the sense given to the word by Professor Weismann" (p. 732).

Again, Dr. Romanes, in the April number of *Contemporary Review*, raises the question in another manner. "If, however, we turn to plants, we find a considerable number of facts which show that, in not a few cases, the germinal matter of pollen-grains is capable of asserting its influence beyond the ovules to the somatic tissues of the ovary, and even to the flower-stalk of the mother plant. Here, then, we have simple and conclusive evidence of the material of heredity exercising a direct influence on somatic

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tissues. How this well-known fact is to be met by the theory of germ-plasm is a question which does not seem to have thus far engaged the attention of Professor Weismann, or of any of his followers" (p. 515).

Mr. Spencer and Professor Romanes are apparently unacquainted with Weismann's latest treatment of this subject (chapters headed "Regeneration," "Multiplication by Fission and by Gemmation," "Alternation of Generations," "The Formation of Germ-cells") in his book entitled "The Germ-plasm."

De Vries attempted to explain such phenomena by a hypothesis similar to those of Mr. Spencer and Dr. Romanes, to the extent that it assumes, under certain conditions, an identity of somatic with germ-cells.

All such cases as those instanced by Mr. Spencer are clearly explained by what Weismann terms "germ-tracks." The transfer of inactive germ-plasm through series of somatic cells to various distant parts of the organism is *demonstrated* by Weismann to be among multicellular organisms a regular occurrence. When this germ-plasm becomes again the sole constituent of a cell, that cell is a primary germ-cell. This, at first, simply multiplies. When multiplication ceases, differentiation begins, by the "determinants" for ova and spermatozoa becoming active. Then embryogeny, provided the necessary conditions have been fulfilled, commences. Now, if this germ-plasm can migrate or be conveyed in a latent state to various parts of the organism, Spencerites might ask, What is to prevent *any* cell from thus becoming a germ-cell? Where is the contradiction to our assumption that the soma and the reproductive elements are not distinct? Weismann has no difficulty in giving the answer. *He demonstrates that, in every individual of the same species, the same series, and those only of somatic cells, constitute the germ-track.* Thus Weismann shows that the theory of germ-tracks offers no support to the assumption of identity between somatic and

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germ-cells. If these were the same, there could be no such distinction as of cells *exclusively* devoted to the transfer of latent germ-plasm; any cell might then, according to the assumption of germ-tracks, be assumed as capable of reproducing the organism. We might then offer a ready explanation of propagation such as that instanced by Mr. Spencer; but the explanation would, as now shown, be utterly opposed to the facts of evolution.

Further, it is proved that even those cells which carry the latent germ-plasm are true somatic cells; only the last of the series, in which the germ-plasm renews its activity, is a germ-cell. The distinction between the germ-tracks of De Vries and those of Weismann is that the cells of the former are assumed to be germ-cells. Weismann will have no cells germ-cells except those containing in an active state all the "determinants" necessary to the formation of a complete individual. "Transitions between somatic and germ-cells never occur, and De Vries' opinion simply rests on the fact that he confuses germ-cells with the cells of the germ-track. That the latter must be regarded as somatic cells has already been shown. In my opinion germ-cells were sharply distinguished from somatic cells on their first appearance in phylogeny, and this distinction has since persisted. In no species, whether animal or vegetable, can there be any doubt as to the cells which are to be looked upon as germ-cells; and as regards the somatic cells, such a doubt can only arise when cells in the germ-track are regarded as germ-cells. I know of no more convincing proof of my view than that which is furnished by the *Volvocinæ*. These organisms consist of communities of cells which may or may not exhibit a division of labour, and in which a contrast between the somatic and germ-cells may or may not exist. In *Pandorina* all the cells of the colony are similar to one another, and each performs all the vital functions. In *Volvox* the cells are differentiated: some of them have the function of maintaining the individual, and

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others of preserving the species; that is to say, they are differentiated into somatic cells and germ-cells. The heteroplastid genus *Volvox* must have arisen phyletically from a homoplastid form; but we can hardly imagine that there can be many intermediate stages between these two, for at the present day the two kinds of cells in *Volvox* hardly differ as much as do the somatic and germ-cells in the case of the higher organisms. *The somatic cells have nevertheless entirely lost the capacity of reproducing the entire organism.* (Italics writer's.) Transitions between these two kinds of cells could naturally only arise by the germ-cells first becoming only slightly differentiated from the somatic cells, and could not have been produced, as De Vries thinks, owing to all the cells containing germ-substance in a more or less latent condition from the first. There is no germ substance in the somatic cells of *Volvox*, which, figuratively speaking, have only just become differentiated from the germ-cells. *If the latter are artificially removed from a colony, the somatic cells continue to exist for a long time, but they do not give rise either to new germ-cells or to a new colony.*" (Italics writer's. "The Germ-plasm," p. 213.) Here we have an organism in which the differentiation between somatic and reproductive parts has only just, as it were, begun; yet we find the differentiation absolute. It is evident that, the further organism advances in complexity of structure, the more impassable will be the chasm between the soma and the reproductive elements, and that by assuming, in the case of highly differentiated structures, such identity as that inferred by Mr. Spencer, we are misconceiving the very foundation of the system of evolution.

The controversy between Mr. Spencer and Dr. Romanes as to Weismann's conception of "Panmixia" seems to me to be decided by the following passage (vol. ii. of Essays, p. 76): "I believe that I have shown that organs which have ceased to be useful become rudimentary and ulti-

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mately disappear owing to the principle of panmixia alone, *not because of the direct effect of disuse, but because natural selection no longer maintains them at their former level.*" (Italics writer's.) Mr. Spencer maintains that Weismann's panmixia is an *active* process. Dr. Romanes asserts that it is merely the *cessation* of selection. It will be seen that the latter's assumption is the correct one.

INTRODUCTION TO WEISMANNISM AND SOCIOLOGY.

A Controversy.

The two articles appearing in the *National Reformer* of April 30th and May 28th (Chapters IV. and V. of this volume) were in reply to certain arguments advanced by Mr. Herbert Spencer, in the *Contemporary Review*, against Weismann's theory, and generally to defend his (Mr. Spencer's) doctrine of the hereditary transmissibility of acquired qualities. In the *National Reformer* of June 4th, there appeared a three-and-a-half column article, and, in the following issue, June 11th, another of over three columns, entitled "Weismannism and Sociology," written by the editor, Mr. Robertson. These were followed by a series of long notes, criticizing the articles of myself and another contributor to the discussion—Mr. W. Platt Ball. In these notes Mr. Robertson, besides criticizing the propositions of Mr. Ball and myself, raised a multitude of fresh issues entirely outside those propounded in his two articles, and on that account, of course, beyond the scope of reply in the preceding contributions of Mr. Ball and myself. Thus, instead of having before us a complete statement of Mr. Robertson's case, we were compelled to meet all the afterthoughts which occurred to Mr. Robertson as incidental to the fresh complexion which the criticism of Mr. Ball and myself gave to Mr. Robertson's standpoint,

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as originally propounded in his two articles. In fact, all the really plausible contentions of Mr. Robertson thus arose from our criticism.

Mr. Robertson's original articles were evidently intended to be a slashing exposure of certain assumed fallacies propounded by me in "Against Dogma and Freewill." A few extracts culled from the articles and notes will afford the reader a fair idea of the temper of Mr. Robertson's onslaught:—

"It is because I am satisfied that Mr. Hiller is turning Weismann's biology to an end never contemplated by Weismann, and one in no way justifiable on Weismann's grounds, that I write this criticism."

"It was there" (in the review appearing in *National Reformer* of my book) "pointed out that there was an absolute hiatus between Weismann's final conclusions and Mr. Hiller's political doctrine. Weismann's teaching is that 'acquired characteristics' in organisms are not inherited; and by acquired characteristics he means (1) injuries; (2) functional variations; and (3) variations depending on the so-called 'influence of environment.' That is to say, *e.g.* (1) if a man has his leg cut off but lives to have children after it, his children will not lack a leg, any more than they will be born with wooden legs such as their father may have adopted; (2) if by habitual over-eating or otherwise a man grows fat, or if by over-exercise he starts a varicose vein, or if through fever he loses his hair, his children will not inherit these characteristics; and (3) if he becomes very brown through living in a hot country, his children will not be born brown in consequence. All which propositions seem plausible enough. But on these propositions Mr. Hiller proceeds to rear (if I understand him aright) the further and very different doctrine that the human race cannot be improved by education or by social reorganization."

"It will now be seen how the criticism begins to bear

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upon the sociological application of Weismann's biology by Mr. Hiller, an application for which I do not believe Weismann is really responsible even in its most restricted form—to say nothing of its worst form."

"All attempts to turn Weismann to the account of biological Toryism, on the lines of Mr. Hiller, are at once quashed. *It is precisely the refinements of the nervous system, and the correlative modifications of the brain, that believers in progressive heredity set their main hopes on.*" (Mark these words italicized by me. They maintain all I oppose.)

"Mr. Hiller's dictum that modern sociology and modern Socialism are built upon Lamarck is a complete fallacy."

"In view of Mr. Hiller's attempts to group politicians according to their attitude towards Weismann." (Nobody could be more surprised than was Mr. Hiller to find that this was his object!)

"It is a great pity that a biological and a political issue should be thus conjoined; and it is difficult to follow with any confidence a single step of the reasoner who conjoins them. As for Weismann, he strictly confines himself to the scientific issues; and it is impossible to guess what he would say of the ends to which some of his followers seek to turn his doctrine."

"I am merely controverting the spurious Weismannism of Mr. Hiller."

"But some of Mr. Hiller's doctrines are so wholly outside Weismann's formulas that they are not properly to be connected with Weismannism at all."

"In our review of his book there was quoted an astonishing passage, to the effect that 'society cannot afford to turn navvies' sons into graduates'."

"Mr. Hiller's Toryism is so *naïve*, so primæval, that one cannot remain even indignant over it."

"It only needs that we point out once more the profoundly unscientific nature of his doctrine."

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"So we need not urge upon him the propriety of changing places with some navvy's son who has a real gift for biological and social science. We need only repeat that no fallacy in Lamarck or Darwin possesses a tithe of the fallaciousness of his reasoning here, and that some of his fellow-Weismannites will be the most emphatic in their repudiation of his theorem."

It will be seen from the foregoing that Mr. Robertson had a fairly confident anticipation (considering that his own knowledge of Weismannism betrayed, during the discussion, a very superficial character, one might almost call the anticipation presumptuous) of pulverizing the author of "Against Dogma and Freewill."

In the issue of June 18th appeared my reply to the two articles of Mr. Robertson, in which articles, it may be justly said, no genuine biological argument was advanced against the writer's application of Weismann's theory; but an able forensic display was afforded, proving Mr. Robertson's efficiency as a special pleader.

In the issue of June 25th, Mr. W. Platt Ball entered the controversy and supported me in these terms: "In Mr. Hiller's sociological application of Weismann's chief biological doctrine, there is no 'singular perversion of Weismannism.' There is, indeed, an 'absolute hiatus' between Mr. Hiller's conclusions and Mr. Robertson's view of Weismann's doctrine, but this is another matter altogether. On Weismann's theory of the continuity of the germ-plasm the inheritance of the effects of use and disuse is impossible. It follows, therefore, that the effects of education and habit cannot be transmitted by heredity. Mr. Hiller accepts Weismann's doctrine as proven, and enunciates some of the sociological consequences with refreshingly outspoken vigour it is perfectly clear that his main contention is not in the least 'spurious,' but is a strictly logical outcome of a theory which denies the possibility of the inheritance of acquired characters."

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Mr. Ball's scientific method, in this article, naturally played havoc with Mr. Robertson's idealistic "castle-building," which Mr. Ball considered to be "largely based upon fundamental misconceptions of Weismann's position."

In the issue of July 2nd, a note by Mr. Robertson was appended to my reply. In this note, I was informed that "convulsive reiterations of a proposition are not proofs. Where he says he has shown things, he has simply said them." As to the correctness of these remarks, it is for the reader to decide. Mr. Robertson proceeds thus:—"For the rest, as Mr. Hiller thinks well to spend the space allowed him on mere asseveration, and does not see fit to knock down the skittles which he tells us he *could* knock down, I cannot invite him to repeat himself yet further. He has had his say; and, barring new arguments, it is certainly not worth while to extend the discussion further. Readers can form their judgments themselves. There are too many demands on our space to permit of its being wasted on inconclusive rhetoric. But the subject is an obviously important one; and we shall no doubt have occasion to recur to it as new matter arises."

After reading these sentences, I must confess to having entertained an uncharitable suspicion that Mr. Robertson was beginning to find that he had grasped more prickles than he could comfortably handle, and was desirous of "peace with honour!" As my object in entering the controversy was not to gratify my vanity at the expense of an opponent, I had, personally, no very strong objection to this importation of the method of "orthodox" theological propagandism into our discussion: I was, on merely personal grounds, quite content that Mr. Robertson should have "peace with honour."

Beyond this, my sentiments towards Mr. Robertson are of the most cordial esteem. In these days, when press-organs are, too often, merely the hacks of partisanship, when

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men read press opinions, not to gain a true grasp of issues, but to hear the echo of their own prejudices, it is indeed something like a revelation of the "good time coming" to find one editor ready to allow in his columns the ventilation of principles which he considers subversive and fallacious. Because he has done this, I esteem Mr. Robertson.

On the other hand, he who is fighting for a truth which is offensive to the prejudices of society, yet vital to its interests, cannot afford to be swayed by personal considerations. He must wage "war to the knife," or see his cherished verity stifled out of active life by that mountain of swagger: conventionality. On this account I protested against Mr. Robertson having "peace with honour." After judiciously applying the *suaviter in modo* combined with an almost imperceptible suggestion of the *fortiter in re*, I induced Mr. Robertson to allow me to write a final reply, in which I put as many of Mr. Robertson's specific mis-statements to the fire of scrutiny as I supposed would be consistent with the probability of seeing my remarks in print. Naturally, I concluded that, as he would give me no more tether, Mr. Robertson would also give me no more prods. However, after sending in my "final," there appeared a long note appended to Mr. Ball's article of July 16th, in which Mr. Robertson prodded me as energetically as ever! In reply, I sent him the postscript which here appears under the "final," but which postscript was returned by Mr. Robertson. Judge, jury, and culprit—here was a complex product of the new sociology apt to perplex the plaintiff!

Yet worse was to come. Mr. Robertson added the longest note of the series to my "final": a note so filled with hyperbolic distortions, dogmatic reiterations, dialectical sinuosities, and controversial courtesies that, to deny me the opportunity of answering it, was to add the pangs of Tantalus to my appreciation of Mr. Robertson's sublime effrontery and editorial chivalry. Of Mr. Robertson's con-

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troversial courtesies, I will here say no more than that they have afforded me a titillatory sensation of delight only surpassed by that of the hairdresser's application of his rotatory brush to my scalp. Nor will I here display to the reader's bewildered admiration the marvellous dialectical sinuosities, in the manufacture of which Mr. Robertson is such a past-master. I will confine myself to one or two irrationalities, in the demolition of which, I hope, the plain student of fact will be able to follow me without undue strain on his mental apparatus.

"In saying: 'I have not deprecated State-schools; I have only deprecated indiscriminate brain-suffering,' Mr. Hiller backs out of a position he finds untenable, without having the candour to admit his surrender. He said nothing whatever about 'indiscriminate brain-stuffing' in the passages originally cited; and it is a little too much to affect to believe that my argument has been directed against such a position as that. No human being would ever justify 'indiscriminate brain-stuffing'; and a man who should seriously undertake to prove that it was undesirable would be a fool. Mr. Hiller was really not quite so trivial as he now makes out." (Here the reader will discern a distinct titillatory delight for Mr. Hiller.) "The sentence: 'Weismannism *involves the foregoing questions, because*' (italics Mr. Robertson's) etc. is blank nonsense. The 'because' is wholly outside the issue expressly laid down in the two sentences quoted from me: it raises another issue. And when he goes on to give reasons why the State should not select specially gifted children of workers for secondary training at the public cost, Mr. Hiller is *not expounding Weismannism at all.*" (Italics Mr. Robertson's.) "He is giving only his own political notions. Now, the issue raised was expressly this: 'How can *Weismannism*'" (italics his) "'be pretended to involve this?" . . . "In giving his *own* reasons (not Weismann's) in support of his political thesis, Mr. Hiller

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simply dodges the question. He evades the point that, according to Weismannism some children of workers may be very highly gifted, and *some* children even of cultured people otherwise, to say nothing of the children of the merely well-to-do. He argues childishly against educating multitudes up to the 'potentiality to become effective Lord Chancellors.' I never suggested any such thing. I have again and again indicated that I do not believe all or even many men *can* be educated up to such a potentiality. My words were, 'select *specially gifted children of workers* for secondary training at the public cost.'"

In Mr. Robertson's first article, June 4th, I was taxed with raising an issue outside Weismannism that: "the human race cannot be improved by education and social reorganization." The following quotation from one of my own articles in reply to Mr. Spencer's argument in the *Contemporary Review* was used as a peg on which to hang Mr. Robertson's indictment. "How long shall we cling to the superstition that we are going to regenerate humanity by our Board Schools, our new 'moralities,' our anti-this-that-and-the-other propagandas?" Now, this issue was absolutely independent of the question whether or not the effect *on the individual and through him on society*, of these influences was beneficial, or otherwise. My contention solely referred to the question whether or not these influences could affect the *type through heredity*. The affirmative answer to this was distinctly given in the italicized quotation on page 199, from Mr. Robertson. That Mr. Robertson so understood my contention is, moreover, abundantly proved by his own desperate attempts throughout the controversy to show that such influences *could* hereditarily affect offspring. A few lines lower in this first article, Mr. Robertson adds another extract from my article: "By no hereditary transmission can the effects of a man's exertions react on his posterity. They will inherit nothing more, structurally and 'mentally,' from their

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parents, than those inherited from their parents, and so on backwards, *ad infinitum*." Here was the only proposition which *I* maintained as beyond question. Mr. Robertson, after quoting the above, then asks almost indignantly: "Is this, then, Weismann's doctrine?" At that time, evidently, Mr. Robertson had only an eye for what appeared to him as a flagrant fallacy: the assertion of the impossibility that extraneous effects on the individual could be hereditarily transmitted to posterity. With laboured and sometimes ludicrous pertinacity, throughout his two articles, Mr. Robertson endeavoured to disprove my thesis. Only after the appearance of my and Mr. Ball's articles did Mr. Robertson abandon his original line of attack by importing into the discussion the totally different issue, whether it is expedient that society should gratuitously afford each individual the higher education. To any reader who wishes to verify the above statements as to the origin of the controversy, the *National Reformer* is available for reference. Having said this much as to the origin of the discussion, I hope that the reader will perceive what is the vital truth involved, and why, that truth having been abundantly confirmed by the controversy, Mr. Robertson is anxious to make capital out of the mere matters of opinion which he has brought into prominence. Although my original intention was merely to contend for Weismannism and certain social issues proceeding from it, I have not shrunk from the ordeal of controversy on the minor points of opinion, and, so soon as Mr. Robertson offers me adequate reason for doing so, I am quite ready to "back out" of any position I have taken with regard to the expediency or inexpediency of turning the mass towards the higher culture. So far, I regret to say, Mr. Robertson's efforts in this direction have mainly consisted of rhetorical flourishes, clever, but unconvincing to his quite unprejudiced opponent. I can only reconcile my statement as to "indiscriminate brain-stuffing" with Mr. Robertson's

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criticism, by inferring that his ideas on this subject are not mine. I consider the spreading broadcast of the so-called higher scholastic training would be "indiscriminate brain-stuffing," because it involves that a system of brain-stuffing shall be applied universally which is only tolerable when applied conditionally. On this account I should demur to Mr. Robertson's assertion that "a man who should seriously undertake to prove that it was undesirable would be a fool." I should feel more inclined to consider a man a fool if he tried to prove it desirable! From my point of view, the question is not whether "all or even many men can be educated up" to the potentiality of becoming chancellors, but have as many of the so-called lower, as of the so-called higher, classes the potentiality to become chancellors? I emphatically maintain that they have, and I defy Mr. Robertson to prove the contrary. Then, I assume that Mr. Robertson, being a "Radical" and a Socialist, would not deny to these "lower" classes equal facilities at the public expense, to those available to the "higher" classes at their own expense, to become chancellors. If Mr. Robertson denies that he would offer such equal facilities, then he and I do not materially differ on the point, but Mr. Robertson stultifies his own arguments by sacrificing the whole logic of his position.

Except by the application of the "higher" culture to the individual, it is impossible to discover whether he is "specially gifted" with the capacity to assimilate it; we must apply it to *all* before we can ascertain how many are "specially gifted." Then the question arises whether the "game is worth the candle" *to the community*—whether it is not better to overlook a few "geniuses" than to discover them and invalidate the efficiency collectively to the community of the common herd. According to Mr. Robertson's *logical* position, the *right* to benefit by the "higher" culture belongs to each unit of society: the impecunious are to exercise this right at the expense of the community.

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To say that only a *portion* of the impecunious, the "specially gifted," are to be afforded the advantage, is to make an arbitrary and invidious selection, and one that is, moreover, unreliable. Nothing is more delusive than the apparent capacities of young people at school. The greatest dunces often turn out the men of mark; the Admirable Crichtons fizzle out like penny "squibs."

Mr. Robertson talks about "secondary training at the public cost." What does he mean by "secondary training"? The only "secondary training" that I conceived him to mean, was the "highest" available culture. Why should he stop short before this? What logical reason has he for stipulating for any intermediate stage between the ordinary Board School curriculum and the university? A man is a mere brute without some degree of education; with too much of it, he often becomes an addle-pated prig. I maintain that, so long as society tolerates millionaires, the degree of education adapted to the navvy's son is not that adapted to the millionaire's. Both on his own and on society's account, I maintain that the ordinary Board School education is all that the community should afford the navvy's son. But, remember, I maintain this, *under the present conditions as to the distribution of material wealth.* With these altered, but *not before they are altered,* I would proportionately diffuse more widely the higher intellectual culture. If I thought, as Mr. Robertson now *wants* to think, that the effect of education was hereditarily cumulative on the type, I might deem the present Board School education insufficient. But, *because of Weismannism,* I realize that "a man who should seriously undertake to prove that it was" insufficient "would be a fool"! "Weismannism involves the foregoing questions, very much '*because*'"! To talk about my giving my own, "not Weismann's" reasons in support of my thesis, is to trifle. I care not whose reasons they are, so long as they are sufficient. That they *are* Weismann's reasons, the whole of his writings

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confirm. One passage alone, quoted in my article of June 18th, is enough to show that Weismannism, if it involves anything, involves the question of the hereditary transmissibility of the effects of education, and in deciding that, materially influences the decision of the further question, whether it is expedient to spread broadcast the "higher" culture. Therefore, it is "blank nonsense" to state: "When he goes on to give reasons why the State should not select specially gifted children of workers for secondary training at the public cost, Mr. Hiller is not expounding Weismannism at all." It is further, in my opinion, "blank nonsense" to assert, because "some children of workers may be very highly gifted," and other children of non-workers otherwise, that we should waste the muscle-efficiency of the community in a "wild goose chase" after these "very highly gifted" freaks of nature.

Mr. Robertson characterizes my comparison of the effect of podophyllin on a liver with that of mathematics on a brain as an "absurdity." A great fault I have to find with Mr. Robertson is that he is readier to *call* my arguments absurd than to *prove* them so. In his criticism of my remarks on the above analogies, Mr. Robertson offers nothing but imaginary assumptions, to which it would be a waste of effort to devote scrutiny. His retort to my criticism of his confused distinctions between somatic results is merely verbal hair-splitting and has no connection with the main issues. The following statements intended by him to confirm his assumption of correspondence between influence and effects, are merely reiterations, in other words, of fundamental fallacies propounded in his various articles and notes and exposed by Mr. Ball and myself. However, it may be of use to again go over the old ground. Mr. Robertson states, in his last reply to me: "Putting aside Mr. Hiller's absurdity" (my analogy between liver and brain), "I will say, for the benefit of anyone following the discussion, that I cannot see how men have come to possess

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higher mathematical capacity than the anthropoid apes if the faculty were not capable of cumulative transmission under certain conditions." For this reason, the comparison here made between apes and men is as much an absurdity as Mr. Robertson conceives my analogy between brain and liver: one essential condition, wanting in the case of the apes, is pre-eminently active in the case of the man. This condition is language with its ensuing tradition. I refer the reader to the quotation from Weismann given in the article of June 18th, with respect to the musical faculty; to my remarks on page 86 of this work, and generally to the arguments advanced therein, for a demolition of Mr. Robertson's assumption respecting the mathematical faculty in man. Mr. Robertson's comparison between apes and men is here further futile, because Mr. Robertson has not attempted to show that apes have *any* rudimentary mathematical faculty capable of development; while, in men, he, of course, assumes such capacity, and bases thereon his whole contention: that, by continuously exercising the faculty, man has hereditarily increased it. If apes have nothing (mathematically) to develop, what is the use of comparing them with men, who have something (mathematically)? It would have been here as much to the point had Mr. Robertson propounded a similar comparison between man and a dog—or a black beetle! Further, even could he show that apes have the mathematical faculty, it would then remain for Mr. Robertson to prove that they also have the faculty to transmit by tradition the acquirements of one generation to the next, before he could logically apply his comparison of the results attained by men and apes.

Here is another fundamental fallacy, or rather the above, in another shape: "A race accustomed to climbing and pure air will 'probably' develop strong lungs, not weak." They will "probably" and, more than "probably", assuredly, neither hereditarily "develop strong lungs," nor weak ones,

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on account of the climbing or pure air. That the individual will by climbing and pure air probably strengthen his own lungs, nobody denies. That he and his wife, whether they climb or do not climb, will transmit to their children only such lungs as they, the parents, have inherited from their ancestors, involves the main affirmation of Weismannism. Naturally, a race of mountain-climbers will be adapted to climbing, in respect to lungs and limbs; but this does not mean that the climbing has typically affected the people by the inherited effects of individual exercise. It simply means that those families with defective lungs and limbs have abandoned mountain-climbing, or been killed off by disease. To experimentally demonstrate the effect of mountain-climbing on the type, we must transplant a town population to a mountainous district and compel them to become adapted to their surroundings, or perish: in other words, natural selection must operate. Inevitably, the "unfit" would then succumb and the type ultimately conform to its environment; but, this typical modification would occur through elimination of the "unfit," not through the hereditary transmissibility of the effects of individual climbing. Here is some more of Mr. Robertson's nescience: "I do not call a gift for poetry an 'obvious' somatic phenomenon." Now this represents an absolute jumble of exact definition with definition that, scientifically viewed, is meaningless. We know exactly what is meant by a "somatic effect"; but, what is a "gift" for poetry? Is it something else than a special cerebral conformation involving the capacity to express in adequate phraseology certain exaggerations of sensitive phenomena which, in their normal strength, are common to civilized men? Is it anything but an arrangement of nerves and cells of abnormal sensibility? I again refer the reader to this book for an answer. After ascertaining what is a "gift" according to scientific psychology, and what is "a somatic effect" according to biology, I have no doubt what the intelligent reader

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will stigmatize Mr. Robertson's dictum that "a gift for poetry" is not a somatic phenomenon. Mr. Robertson remarks, referring to my account of the cause of differences in the offspring of the same parents: "It is no solution of the problem of differences in children to merely say that the ova and spermatozoa are all individually different . . . The question is, What makes one set of elements triumph in one conception and another in another? Weismann simply posits the variation. We want the cause of the variation." Now, whether Weismann has, or has not, solved this problem, it is quite beyond question that Mr. Robertson has utterly failed to answer it. But, Weismann *has* solved it, so far as solution is humanly possible. Mr. Robertson, by enunciating another problem beyond the reach of research, does not help his own thesis, nor does he more damage Weismannism by asking his question, than he would damage physics by asking why light travels at the rate of 186,300 miles in a second of time. If we cannot give demonstrations of the formation of a living organism, that is no reason why we may not demonstrate the observable activities of the factors which constitute that organism. If we cannot demonstrate *why* a certain arrangement of nerves and cells should so operate as to transmute an external phenomenon into an idea, that is no reason why we should refuse to believe scientific psychology when it offers us adequate evidence that this nervous and cellular arrangement *does* so transmute an external phenomenon. Mr. Robertson affords us absolutely no evidence to support his own assumption of a cerebral effect distinct from all others; yet, he demands that the very origin of life shall be rendered as perceptible to his own senses as is a plum pudding, before he will accept the demonstrations of Weismannism. If he applies the same principle to other classes of research, he will logically set his own *a priori* preconceptions against every scientific method of demonstration available to mankind. Research will offer us ample evidence to satisfy reason, but it will

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never, in my opinion, reach the *fons et origo* of even the simplest natural phenomenon.

It may now be useful to extract a few comments on Mr. Robertson's propositions from Mr. Ball's articles. These will show what a scientist thinks of Mr. Robertson's position.

"There seems to be no physiological means by which either physical traits or mental impressions can be conveyed to offspring during gestation. Instead of having" (as Mr. Robertson asserts) "'the scientific root of the matter,' a mother who reads up history or other subjects in order that the seeds of a taste or capacity for such studies or thoughts may thereby be implanted in her child before birth, is indulging in a thoroughly unscientific expectation."

"In cases of alcoholism, ergotism, &c., the harmful drug or poison pervading the system of the mother may also disastrously affect the embryo quite independently of the principle of heredity. In such cases as syphilis, contagious particles or microbes evidently infect the ova or spermatozoa, and thereby the offspring." (Mr. Robertson had instanced such effects as the foregoing as evidence for the transmissibility of extraneous influences.)

"Mr. Robertson's article is largely based upon fundamental misconceptions of Weismann's position."

"Weismann's observations on changes in butterflies are misunderstood, and are made to bear a meaning widely different from that intended."

"In Mr. Hiller's sociological application of Weismann's chief biological doctrine, there is no 'singular perversion of Weismannism.' There is indeed an 'absolute hiatus' between Mr. Hiller's conclusions and Mr. Robertson's view of Weismann's doctrine, but this is another matter altogether. On Weismann's theory of the continuity of the germ-plasm the inheritance of the effects of use and disuse is impossible. It follows, therefore, that the effects of education and habit cannot be transmitted by heredity.

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Mr. Hiller accepts Weismann's doctrine as proven, and enunciates some of the sociological consequences with refreshingly outspoken vigour . . . It is perfectly clear that his main contention is not in the least 'spurious,' but is a strictly logical outcome of a theory which denies the possibility of the inheritance of acquired characters."

"I am told that my defence of Mr. Hiller 'ran to pieces.' The 'main contention' which I defended was that 'on Weismann's theory . . . the inheritance of the effects of use and disuse is impossible,' and that therefore 'the effects of education and habit' (including, of course, Board School teaching and discipline) 'cannot be transmitted by heredity.' Whether this was 'loose affirmation' or not I cannot see that it has in the least run to pieces."

It may be instructive, in connection with the above, to repeat the following remarks by Mr. Robertson.

"It is because I am satisfied that Mr. Hiller is turning Weismann's biology to an end never contemplated by Weismann, and one in no way justifiable on Weismann's grounds, that I write this criticism."

"It was . . pointed out that there was an absolute hiatus between Weismann's final conclusions and Mr. Hiller's political doctrine."

The following are further quotations from Mr. Ball.

"The chief feature in Mr. Robertson's reply to my remarks is the continued misunderstanding of the position taken by Weismann. I thought I had cleared up this matter. Weismann and his supporters do *not* acknowledge the 'gradual' modification of organisms by 'use-inheritance,' as Mr. Robertson still supposes, in spite of all that I have said to the contrary. The very essence of our belief and contention is that effects of use and disuse . . . cannot be transmitted to posterity either suddenly or gradually."

"Mr. Robertson's views are rather peculiar."

"Neither Mr. Hiller nor myself, we are told, has attempted to deal with the fact that widely different

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children are born of the same parents. I see no sufficient reason why we should spend our time in discussing amphimixis, atavism, variation, and the various other subjects which are involved in such an explanation. Neither do I see why we should have 'met the challenge' supposed to be involved in some remarks concerning 'colour-changes in fish,' and the peculiar conditions of 'highly self-conscious and nervously complex organisms.'"

"The main issue as to Weismann's views is now reduced to a very simple point. We are still told that Weismann teaches the inheritance of acquired characters; but then, Mr. Robertson, it turns out, only means thereby that modifications *of the germ-plasm* are transmissible—a point which no one disputes. But those who introduced the term 'acquired characters' did so for the special purpose of excluding the very meaning which Mr. Robertson here applies to it. By 'acquired characters' they mean acquired *somatic or bodily* characters, as distinguished from alterations commencing in the germ-plasm. This distinction is the very foundation of the whole controversy. Of course if Mr. Robertson chooses to use technical scientific terms in a sense which they were specially intended *not* to bear, he can easily show that Weismann, or anyone else, teaches the exact contrary of the views he really advocates."

Readers of this volume will, I hope, realize the straits to which criticism had driven Mr. Robertson when he attempted to argue from the effects of heat on the germ-plasm of a butterfly to the transmission of the effects of the muscle and brain exercise of human parents to their offspring. Only the very desperation of prepossession and combativeness could reconcile a man like Mr. Robertson to the puerility of confounding somatic effects with those on germ-plasm. No rabid theologian ever evinced more pronounced theory-madness than this. On his "mare's nest" of the effects of heat on germ-plasm rests the *whole* of Mr. Robertson's phantasmagoric erection. When he

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discovered this "mare's nest," he jumped at it like a fish at a hooked worm! It was painfully interesting to me to notice the intensity with which Mr. Robertson clutched at his "mare's nest." It cut me to the core to be reproached by Mr. Robertson for having deluded him to the belief that no "mare's nest" existed, while I, innocent as babe unborn of the desire to deceive Mr. Robertson, had actually bawled into his ear the exact spot where the "mare's nest" reposed! Witness these remarks: "There is one important reservation to be observed in assuming this renunciation of the Lamarckian theory. In the earliest unicellular organisms which reproduce themselves by division into two identical halves, the Lamarckian principle would operate. In such organisms extraneous influences are capable of hereditarily altering the succeeding generation, because in them there is no distinction between body-cell and germ-cell; any external influence changes the entire individual, which being nothing but reproductive element, must necessarily transmit the modification. By this fact it is possible to satisfactorily account for the primal individual differences which laid the foundation for that infinite system of permutation which began to operate as soon as sexual supplanted asexual reproduction." ("Against Dogma and Freewill," page 14.)

After having written the foregoing it was indeed hard to be thus visited by Mr. Robertson: "Mr. Hiller and Mr. Ball keep their eye on somatic characters, saying these are not transmitted: and they never, until they are pushed to it, note that Weismann expressly alleges modification of the germ-plasm by environment." (*National Reformer*, July 16th.)

In his reply to Mr. Ball (July 23rd), Mr. Robertson writes:—

"Those who will go back to my first articles will see how many points—and these avowedly *my* main points—have been carried and departed from; and how essentially

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the Weismannite theses have had to be modified from the form in which I attacked them."

It may interest the reader to know what really were the points advanced in Mr. Robertson's first articles. Here they are :—

1. That Weismann does not deny the hereditary transmissibility of "mental" influence.

2. That such influence is hereditarily transmissible.

3. That there is "an absolute hiatus" between my doctrine and Weismann's teaching.

4. That as environment can hereditarily affect primitive organism, it must also hereditarily affect human organism.

5. That climatic effects on germ-plasm are analogous to the effects of culture on the human brain; but, that the effects of culture on the brain are not analogous to those of a drug on the liver.

6. That "maternal impressions" are correspondingly transmissible to offspring.

7. That Weismann rigidly refrains from applying his theory to any question outside biology.

8. That because John Keats turns out a poet, and George a noodle (often the terms are synonymous), their mother must have affected the coming John by some special state of mental exaltation at the time of conception.

9. That political rationalism may encourage itself with the supposition that its efforts will affect the germ-plasm, and that the effects will correspond with the influences.

10. That Mr. Meredith's "young mother," in the "Ordeal of Richard Feverel" when, "in a beautifully feminine way, she set herself to store her mind with wise and high ideas" with the expectation that she would graft her coming child with these ideas, had "the scientific root of the matter in her."

11. That it is expedient to provide navvies' sons with the higher education.

If the reader can discern one among these contentions

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that has been confirmed by the discussion, his mental vision is more acute than mine. On the biological issues raised by Mr. Robertson, I have no hesitation in asserting that he has been controversially exterminated. On the socio-political issues, so far as I am concerned, Mr. Robertson has not altered one opinion which I entertained before the discussion. Yet, to the best of my belief, my mind is less obstinate than the average. As to the "Weismannite theses which have had to be modified," I may observe that, absolutely no biological evidence having been advanced against them by Mr. Robertson, I am quite at a loss to understand what could modify them. Mr. Ball and I have simply been stating and contending for them. Mr. Robertson has been doing some wild shooting which has no more hit the "Weismannite theses" than it has hit the law of gravitation. If Weismannism is destined to be modified, biology, not dialectics, must modify it.

Since writing the foregoing, I notice that Mr. Newman, a colleague of Mr. Robertson, has taken up the cudgels on the latter's behalf. To any student of Weismann it will be needless to stigmatize, should he, perchance, read Mr. Newman's contribution to the editorial wreckage on the rock of Weismannism, the temerity of ignorance which characterizes that contribution.* It would be a waste of effort were I to specifically attack Mr. Newman's pretendedly biological propositions. They are merely a repetition, *ad nauseam* of Mr. Robertson's. But, Mr. Newman's contribution has a graver defect than echoing Mr. Robertson's fallacies and biological ignorance. What this defect is I will leave my readers to characterize when they know the facts. Here they are: Mr. Newman quotes the following from the first volume of Weismann's essays. "We may still maintain that the assumption that changes induced by external conditions in the organism, as a whole, are com-

* See *National Reformer*, August 6th, 13th, and 20th, 1893, for Mr. Newman's articles.

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municated to the germ-cells after the manner indicated in Darwin's hypothesis of pangenesis, is wholly unnecessary for the explanation of these phenomena. Still we cannot exclude the possibility of such transmission occasionally occurring, for, even if the greater part of the effects must be attributed to natural selection, *there might be a smaller part in certain cases which depends on this exceptional factor.*" (The italics here are Mr. Newman's, although he does not state the fact.) Mr. Newman's comment on the above passage is: "That is, the effects of use and disuse may be inherited." Now, note this: the *immediate* context to the above, in Weismann, is the following: "A complete and satisfactory refutation of such an opinion cannot be brought forward at present:" (of course, in his later essays, the demolition of this "opinion" is complete) "we can only point out that such an assumption introduces new and entirely obscure forces, and that innumerable cases exist in which we can certainly exclude all assistance from the transmission of acquired characters." (Essays, Vol. I., page 101.) The facts here are, that Weismann, throughout his writings, has the controversial candour to propound his opponents' theories as strongly as those opponents could propound them, before he controverts them. Mr. Newman has tried to induce readers of the *National Reformer* to suppose that Weismann admitted what he merely propounded as a demonstrable fallacy.

Of course, I cannot pretend to specifically notice all the drivel which, on this subject, will drip from people who presume to teach what they have not learnt. Life is too short for such an enterprise! My mildly summarized comment on Mr. Newman's "biology" is: it is less calculated to impress than are his manipulated quotations from Weismann. Leaving Mr. Newman's "biology" to the fate prepared for it by its own ineptitude, I will now devote a few lines to his philosophy and psychology. Mr. Newman's real thrust at Weismann is from the stand-

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point of, not scientific, but transcendental psychology; in other words, it is based on subjectivity. Mr. Newman turns poetry, music, and science into personalities which look "over the immediate object, to see a reflection of it in other objects." This is very pretty and ingenious; unfortunately it is not demonstration; it is not science; it is the material from which has issued all the fallacy which has deluded humanity; it is the product of imagination. Now, it is well that Mr. Newman should be impressed with the fact that, whether Weismann is psychologically wrong or right in his conception of the cerebral energies resulting in music as we perceive it, has nothing whatever to do with the question as to the hereditary transmissibility of the musical or any other faculty. Weismann is a biologist, not a psychologist: he may be entirely right biologically, entirely wrong psychologically. That he is biologically right is demonstration; whether he is psychologically wrong or right is unessential to the main contention to support which was the purpose of the essay. This contention may be thus stated: the accumulated effects of musical tradition are, beyond hereditary faculty, the sole factors determining the evolution of music; but, these factors can only modify musical evolution by influencing the individual immediately subject to them, and no effect of such influence on him can modify the cerebral conformation of his offspring. Had Haydn not lived, there could, in all probability, have been no Beethoven as we know him. And, the Beethoven we know, as a product of the tradition issuing from Haydn, could hereditarily transmit no efficiency derived by him from the sonata-form invented by Haydn, but could only hereditarily transmit that peculiar combination of cerebral nerves and cells, which enabled him, on Haydn's form, to build a more elaborate musical structure. Moreover, biology and ordinary experience teach us that the probabilities against such a repetition of cerebral peculiarity in the offspring of a "genius" are so great as

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practically to render impossible the evolution among his posterity of a duplicate of that "genius."

I do not purpose to specifically examine Mr. Newman's propositions as to what fancy names should be given to the factors of music, as an art: in other words, as a product of hereditary faculty and tradition. I am here only concerned with music as a product of cerebral energy: as a natural phenomenon. The only method of scrutiny I consider of the slightest value, under the circumstances, is that I should apply to the energy of a heart or liver: the scientific method. I have no more appreciation of the ecstacies of the philosophical art-enthusiast who soars on the pinions of poetic inexactitude into realms of the fantastic, to explain the why and the wherefore of musical evolution, than I should entertain for the ecstacies of a transcendental prizefighter who tried to "ideologically" account for the "artistic" evolution of a professional puncher. A vivid perception of what is, and what is not the scientific method may be obtained by comparing Weismann's essay with Mr. Newman's.

The reader who wishes to assay, at their true value, Mr. Newman's "ideological" deductions will probably find a reliable measure in the writer's psychological arguments advanced in "Against Dogma and Free-will." If Mr. Newman propounds his "ideology" simply as an effort of imagination without any scientific significance, he may, so far as I am concerned, amuse himself. "Ideology" has no more connection with science than has the length of the Emperor of China's "pigtail" (if he has one) a connection with the "Home Rule" Bill. Mr. Newman's pet "ology" offers attractions to those fond of pretty pictures. We Weismannites care more for fact than for pretty pictures, and we cordially detest the blandishment and duplicity which seem inseparable from the method of dialectics. In fact, we have a continually growing belief that truth will only finally prevail when conventional philosophy — speculation not

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based on scientific verification—shall be treated by society with the respect accorded to the dictum of the mock auctioneer or peripatetic quack. In those coming days the masses will demand something better of art and philosophy than that they pander to sentimentality and tickle fancy. Then will come the downfall of all that rank growth in drama, romance, and "ideology" which now sets its authors on little pedestals destined to be contemptuously kicked away by the future ruthless devotee of truth. Then even a Homer, a Shakespeare, a Kant, a Goethe, a Rabelais, a Racine, will appeal to cultured humanity but as the relics of a past and superseded phase of intellectual evolution. That will be the scientific age.

This introduction may be fitly concluded by my appending two significant expressions of opinion showing the appreciation of Weismann entertained by Mr. Robertson *before* and *after* the results of rashly assailing science by nescience became unpleasantly apparent.

In the *National Reformer* of June 4th, 1893, in his first article, Mr. Robertson remarks: "One cannot read Weismann without seeing how much he has of the scientific serenity and open-mindedness of Darwin himself; and that, just as in reading Darwin, one feels that almost any deliberate proposition of Weismann's, be it right or wrong, has behind it a great deal of candid reasoning as well as observation of facts. It is easy to understand how he has already a school of followers behind him." In the issue of July 16th, Mr. Robertson tells us that Weismann "is wont to lay much store by plausibility." Between the above dates something had evidently occurred to modify Mr. Robertson's description of Weismann as Darwin-minded. The last thing Darwin was "wont to lay much store by" was plausibility, and nothing Mr. Robertson could assert could more completely contradict his earlier, than did his later definition of Weismann's mental tendency.

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With a flippancy of ignorant presumption which Mr. Robertson had more good sense than to exemplify, Mr. Newman states (August 6th): "Weismann's biological theory, to say nothing of his application of it to music and the arts, is surprisingly inconsistent, but any necessity for me" (note the *me*) "to prove this inconsistency has been obviated by . . . Mr. Robertson." On those who know even a little of Weismann's work, the assurance manifest in the above utterance is not likely to impress a sense of Mr. Newman's capacity as a critic even of matters with which he is supposed to be acquainted. In connection with this controversy there is one fact from which Mr. Robertson may derive satisfaction: that he did not depute to Mr. Newman the task of opening fire on Weismannism! Though he consider me as presumptuous as I consider him, I tender this advice to Mr. Newman: to study Weismann as he has studied Mr. Meredith, before penning another line about Weismannism!

At the same time, I must warn Mr. Newman that to properly study Weismann will need and deserve an incomparably bigger effort than to study Mr. Meredith. When he has devoted such effort, Mr. Newman will, no doubt, realize that he has been recently employing a pop-gun against a fortress!

WEISMANNISM AND SOCIOLOGY.

CHAPTER VI.

A Reply.*

For the present, at any rate, further ventilation than that in the previous chapters is not needed to make clear to readers the main biological point involved in the new theory of heredity: that extraneous influences do not modify the organic type. Nevertheless, before discussing the socio-

* The above appeared in the *National Reformer*, June 18th, 1893.

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logical questions adverted to by Mr. Robertson, as being improperly involved by me with Weismannism, it will be advisable to offer a few remarks upon certain specific biological, or rather pathological, illustrations which seem to be incorrectly interpreted by Mr. Robertson, as favourable to his own position.

Assuming that syphilis and alcohol may affect the developing germ-plasm by specific toxical effect causing defective nutrition of the embryo, such effect is distinct from heredity, and, mark this, is quite distinct from the method of any influence which could be conceived to issue from sociological factors. There can be no connection between the influence of a specific virus and that of a factor merely affecting the exercise of certain capacities. We might concede hereditary influence to poison, yet utterly deny it to any intellectual factor. Analogy for comparison is here entirely wanting. Whether a man be Liberal, Tory, or Socialist; whether every child be taught mathematics or not; whether we have county councils, or do without them; whether a man be Atheist, Agnostic, or Churchman, can have no effect (assuming the possibility of any effect) on the embryo—let alone on the germ-cell—*remotely approaching the assumed toxical influence of syphilis, or alcohol.* There is absolutely no connection between the questions of the possible hereditary influence of alcoholism and syphilis, and that of social environment.

I will not again go over the ground covered in the former articles, in which I endeavoured to demonstrate the inconceivability—in fact, the physical impossibility—that such an influence as, say, education, could react backwards on the nucleus so as to produce effects on the coming type *at all analogous with the mental influence.* Now, here lies the stumbling-block for the sociologist who thinks that Lamarck will aid him. Assuming that educational factors could affect the nucleus, there could be no resemblance between, say, a man's political and sociological activities, and the

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effect these could be conceived to exert on the minute particle of protoplasm from which offspring will issue. If, then, we have no reason to assume similarity between cause and effect, why, on the assumption of the transmission of extraneous influence, may we not predicate from the *best* sociological teaching a *degenerative* effect on the ensuing type? Even by the hypothesis relied on by the sociologist, we are afforded no jot of evidence proving that this retrogressive result may not ensue. Granted the transmission, we cannot predicate from the influence what its effect may be on the factors of typification. What, then, may sociologists hope to gain from Lamarck? Nothing.

"But, as regards the bearing of Weismann's theory on human affairs, those of us who meddle with sociology are compelled to come to a clear understanding, were it only because not a few of Weismann's disciples are already seeking to give the doctrine political applications where Weismann has made no such attempt. In fact, to judge from Mr. Hiller's and some other writings, some of these disciples have really taken up the theory less for its own sake as a biological doctrine than for the sake of attacking certain social and political doctrines which they do not like."

Now, this position seems to me quite untenable. If Weismann, as a biologist, has not elected to develop his theories in the direction of sociology, that is no reason why others should not so develop them. The question is: Does Weismann's research support the doctrines sought to be built on it? I maintain that it does, and so far I see no reason to doubt the correctness of the application. Moreover, I am fortunately in the position of being able to prove by Weismann's own words that, though he has mainly concerned himself with the biological issues, he is by no means disposed to limit the applicability of his theory to its bearing on biology.

We may take the development of the musical faculty as

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analogous to that of any other effect of culture. The study of music, according to Lamarckians, is calculated to ensure the evolution of a type with increased faculty for music. Now, hear Weismann:

"The amount of improvement possible in a life-time is very limited. No athlete can by any amount of practice lift a weight of a hundred or even twenty hundredweight, although he may be able to raise three or four. And, if our views on heredity be correct, the son of an athlete *will have to start at the point at which his father started* (italics writer's). For the son, if indeed he inherits his father's gifts, *inherits only those with which his father came into the world, and not any increase which they may have undergone during his lifetime* (italics writer's). How is it possible that such an increase in the musical sense took place, as seems necessary to have raised it from the condition met with in the savage, up to that found among civilized races at the present day? No such rise and increase of the musical faculty by itself has taken place. The musical sense is rather an ancient possession of mankind and this was transferred to man from his animal ancestors *and has not increased at any rate beyond the condition reached by the lowest of existing savages* (italics writer's). We have definite proofs of the occurrence among savages of musical talent capable of the same education as our own. We must therefore consider their talent to be as high as ours, although it is generally hidden, because untrained, during the lifetime of its possessor. But if the mental instrument with which we make—I mean, invent and enjoy—music, existed at all times, why did not man perform symphonies and oratorios in the age of the Pharoahs? The answer is clear, *Because music is an invention* (italics here, Weismann's). . . . Man possesses a *tradition* (italics Weismann's); he improves and perfects his performances by passing on the gains of each generation to those which follow. . . . And this is not only true of language, but

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also of the arts and sciences. Not one of these could have existed had not man possessed that advantage over animals which enables him to transmit the knowledge he has gained to his descendants, so that these latter are benefited by building, from the very first, upon the high level reached by previous generations."

The above quotations will show that Mr. Robertson is trusting a "frail reed," if he supposes that sociology or any other human pursuit or condition can be exempted from the influence of the new doctrine. Further, I hope he will now realize that Weismann in promulgating his doctrine has thoughts beyond biology, and that the "absolute hiatus between Weismann's final conclusions and Mr. Hiller's political doctrine" is not so absolute as Mr. Robertson supposes.

Now let us glance at the more purely sociological side of the question. When an age evolves a fresh ethical or intellectual product, that and succeeding ages, we will assume, are affected by the new product. Yet no innate tendency of a human being is thereby annihilated or created; organism, in respect to potentiality, remains as under the old conditions, though society as an entity may be profoundly modified. It will be seen that we may assert the impossibility of regenerating humanity "by our Board Schools, our new 'moralities,' our anti-this-that-and-the-other propagandas," while nevertheless granting that "mankind in general will be mentally raised or improved" by education. The biological evolution of humanity proceeds entirely independently of the achievements of man the individual, who, however, undoubtedly modifies the organism he calls society, exactly, we may say, as protoplasmic elements modify man the individual. To further illustrate the distinction here propounded, let us take an instance. Much activity is at present manifested in the direction of compelling men to avoid "drink." Now, it is quite conceivable that this activity may result in increased

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general reprobation of drunkenness; in much greater restriction on the sale of intoxicants; in a more general disinclination for open drinking. At the same time, it is demonstrated truth that the individual reclaimed by the above factors, retains—notwithstanding that he is no longer a drunkard—every quality which predisposed him to drunkenness. The new environment has simply stimulated certain hitherto latent potentialities into predominance. Let the old environment re-exert its influence, the man will in all probability revert to drunkenness. At any rate, he retains all the potentialities for such a lapse. Now, what we do for this man is to supplant the predominance of one innate characteristic by the activity of some other innate quality. But we have not regenerated the man. We have given him no new biological factor. His offspring —apart from the possibly toxical effect of alcohol on the reproductive nucleus—is absolutely unaffected by his conversion from inebriety.

Of course, the objective observer must always accept with reservation the optimist's claim to advance as the result of the various experiments by which society evolves its destiny. Objectively scrutinized, there is much to make us pause in yielding unqualified assent to the doctrine of "progress." Are Englishmen to-day better than were they of the time of Elizabeth? Who can demonstrate the superiority? Are we, as a nation, better than ancient Greece? Who shall pronounce? Knowledge and experience yield us fresh conditions. The measure of these conditions is merely our subjectivity. The savage is bored by civilization. Wherein lies the superiority of our discrimination over his? Probably the only valid reason for the optimist's appreciation of his own age is that he wasn't born in another age! (Pardon the "bull.") As already stated, I am constrained to admit a factor in evolution at present beyond the cognizance of science. Weismann, in conceiving his primary life-atoms (biophors) provisionally

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binds himself to the same assumption. As soon, however, as organism began to have *historical* qualities—that is, qualities discernible by human observation—he demonstrates in the most cogent manner that this assumption of the unknown factor becomes superfluous for further verification, because the known factors are adequate to explain the phenomena. Of course, science has a salutary dread of invoking the unknown; nevertheless, as Professor Romanes remarks in the *Contemporary Review*, this unknown biological factor may be only on a par with "Natural Selection" before the advent of Darwin. In my book, I strongly affirmed belief in the "supernatural of science." The evidence in this direction is to my mind conclusive, so the unknown biological factor does not perplex me. The "supernatural of science" will, in my opinion, ever recede from our mental grasp, no matter how deeply we probe the beginnings.

* * * * *

The publication of the above, which was sent to the *National Reformer* on June 5th, was deferred so that I might have the opportunity of replying on the whole of Mr. Robertson's argument. After reading the article appearing in to-day's issue, I am not struck by many fresh points of importance needing specific reference. The further seems, to a large extent, a reiteration of the earlier criticism. Mr. Robertson taxes me with the crime of Toryism. I am afraid, if he really knew my politics, he would consider them nondescript.* I will, however, avow this: my ideas of social expediency fall far short of my sympathies; yet, were I to fully formulate these ideas, they would probably startle even the editor of the *National Reformer*. It will be early enough to promulgate the new

* If I may indulge in a little sentiment, I will here avow that, for conventional politics, I have as hearty a contempt as for conventional theology, or any other of the thousand and one shams by which society is honeycombed.

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sociology when certain superstitions standing in the way of its acceptance have been demolished. In the meantime, I will risk the assertion that one of the inevitables of evolution is that Weismann's theory and scientific psychology are destined to remodel civilization. "Inner consciousness" has hitherto been the sole factor in fashioning the destiny of society. It has proved itself a rather whimsical factor, in need of a curb. Men want demonstration to counteract the erratic tendencies of "inner consciousness"! I have expressed certain opinions relating to social expediency. Evidently, Mr. Robertson does not like them. But—here's the rub—he can only demolish them by other opinions! In the quotations which Mr. Robertson has extracted from a document, I may say, scarcely intended for publication, his italics would have pointed less had the extract been continued, thus:

"The society of the future will probably look askance at the aspirations of the navvy. It will esteem him too highly, as a navvy, to encourage him to become a judge. Probably it will be forced to show its esteem by affording him increased material advantages, but it will not incite him to don the ermine. Contemplating itself as an organism of complicated anatomical structure, society will have scant regard for the ambitions of its individual units. To extend the figure: society will discourage the attempt of a foot to usurp the function of a hand."*

If navvy *père* will pay his son's university expenses, by all means let navvy junior aim for the ermine. All I maintain is that society should not pay the bill, and that society should look after itself before it begins coddling the individual. If it gives every man bread that is no reason for giving him turtle soup. If it educates every child that is no reason for turning it into a graduate. On this condition, and this only, in my opinion, can society

* Mr. Robertson, later, acknowledged that by excluding the above context, he had made a not altogether legitimate application of a communication from the writer.

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afford to turn navvy's sons into judges: that it pays the judge a similar wage to the navvy's.

Mr. Robertson's false impression that Lamarck will help his pet doctrines impels him to much windmill-tilting. His arguments are ingenious, his instances plausible, but, really, they are utterly futile against Weismannism. Assuming all his illustrations and deductions as valid to establish use-inheritance—I have already demonstrated many of them to be altogether wide of the mark—unless we can demonstrate *similarity between cause and effect, between influence and its mode of reappearance in offspring,* use-inheritance is worth nothing to sociology. If Mr. Robertson can show, by anything approaching scientific method, that "good" influences are more likely than not to reappear as "good" effects, then, in fighting for Lamarck, he is fighting for something. If he cannot so demonstrate, let him be happy without Lamarck; and let him employ an impersonal "object-glass" in his scrutiny of Weismannism.

CHAPTER VII.

A Further Reply.*

On reading Mr. Robertson's note appended to my reply, in the issue dated June 18th, I am tempted to add the following.

I deny, absolutely and unconditionally, that any extraneous influence acting on the parent (apart from that involving abnormal nutrition of the embryo), that any action of the parent, whether affecting the exercise of "mental" or physical faculties, has the remotest effect on offspring. I affirm, as demonstrated truth, that such influence and action can only affect the parent. Nevertheless,

* The above appeared in the *National Reformer*, July 2nd, 1893.

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in fighting prejudice and ignorance, it is advantageous if we can demonstrate, from the standpoint of opponents (as I have tried to do in my attack on "free-will"), that their deductions from their own premises are destructive to their own positions. This I have also, I think, accomplished in respect to Mr. Robertson and others, by showing that, granted the transmission of extraneous influence, we have no reason to infer any similarity between cause and effect. If there is no such similarity the contention of Mr. Robertson that "good mental" or physical influences—whether affecting the father or the pregnant mother; the vagabond or the saint; the athlete or the journalist; the musician or the painter—are transmissible hereditarily, may, quite as likely as not, involve the necessity that this transmission in the offspring shall mean typical degeneracy. Now, under these circumstances, is it not mistaken policy that those who contend for the assumption of human betterment by culture and other products of civilization should longer coquet with the demonstrated superstition of use-inheritance? Let them wax eloquent about the benefits which, they hope, will accrue to humanity from the realization of their ideals, but—in the name of common-sense—let me invoke them for ever to discard the notion that their ideals are going to remodel the human type. Directly and indirectly, from their own standpoint and from that of Weismannites, this notion is now shown to imply one of the most arrant fallacies ever concocted by "inner consciousness."

Mr. Robertson writes: "I cannot think why Mr. Hiller is always seeking to identify me with Lamarck." Now, really I could not help thinking of M. Jourdain and his prose, while reading this passage. Here we have Mr. Robertson giving us columns of vivid pictures of "refined" maternal impressions transmitted to offspring in the shape of unimaginable effects, occurring through unimaginable means, which effects are, nevertheless, in the end (by some inconceivable elixir, I suppose) bound to consummate an

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improved version of humanity. Here we have Mr. Robertson revelling in such ecstatic visions, yet demurely asking "why Mr. Hiller is always seeking to identify me with Lamarck?" I will reply to this poser of Mr. Robertson, by another. Why does Mr. Robertson propound together distilled Lamarckism and the foregoing question?

I have already, from biological data, met "certain arguments" which Mr. Robertson taxes me with having overlooked, "as to the effect of the mother's state of mind and nerves on the unborn child during pregnancy." I have met these arguments by showing that no "mental," physical or emotional potentialities beyond those which existed in the *parental embryos* can be transmitted to offspring, and that, consequently, all products of extra development, over normal endowment, solely affect the individual in whom they occur. Whenever emotional influences acting on the mother, have injuriously affected the embryo, the instance is not of heredity, but of toxical injury involving mal-nutrition of the developing organism. Further, in the great majority of such cases, there is innate predisposition of the parent to nervous derangement. This, naturally, would be transmitted to the child, apart from any influence on the mother. Ignorance of such facts is probably at the bottom of all the tales one hears of effects of "maternal impressions." This is what Weismann has to say on the subject:

"I have spoken of 'maternal impressions' because I wished to show that, until quite recently, distinguished and acute scientific men have adhered to an idea, and believed that they possessed the proof of an idea which has now been completely, and for ever, abandoned by science. . . . The tales of the efficacy of 'maternal impressions' and of the transmission of mutilations are closely connected, and break down before the present state of biological science. No one can be prevented from believing such things, but they have no right to be looked upon as scientific facts, or even as scientific questions. The first

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was abandoned in the middle of the present century, and the second may be given up now. When once discarded, we need not fear that it will ever again be resuscitated."

Now, Mr. Robertson's converse assumption of *beneficial* maternal impressions is just as (biologically) ridiculous as the foregoing. With all due deference to Mr. Meredith, his "young mother" who has "heard that the character and the capacity of a child depended somehow on the state of mind of the mother during gestation" has heard a well-developed Munchausenism! The sooner she gets rid of it the better. The "mysterious alchemy of the brain and nervous system" has had a deal to answer for in its time. The way in which Mr. Robertson utilizes this convenient ambiguity to authenticate the conclusions of Mr. Meredith's "young mother" would naturally give us the impression that some crusted product of antique transcendentalism, rather than the editor of the *National Reformer*, was the author of what I must term (looking at the matter from the objective standpoint) this pathetic "gush"! Let me ask Mr. Robertson a few questions. Does he or does he not believe that the basis of thought and emotion is physical energy? If he answers affirmatively, what does he mean by asserting that "she may bring it about through the mysterious alchemy of brain and nervous system that the child shall have some of her best potential characteristics rather than some of her worst"? If the brain and nervous system are merely physical agencies for the reception and transmutation of external phenomena, just as is the stomach a metabolizing receptacle for food, how can we conceive the procedure of this discriminating "alchemy"? How can it affect the germ-cell so that the coming child, while passing through numberless stages of evolution from protoplasm to complex organism, shall discriminatively assimilate only those potentialities which the mother, "in a beautifully feminine way," has carefully nurtured in herself? Surely this is "a beautifully feminine way" of

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arguing, rather unworthy of Mr. Robertson. Indeed, it is so artless in its yearnings that one feels almost as much compunction in hurting Mr. Robertson's pretty fantasy as one would feel in hurting Mr. Meredith's presumably equally attractive "young mother." If I were to knock down *seriatim* each "skittle" set up in Mr. Robertson's able argument from subjectivity, I should require a whole number of the *National Reformer;* so I must content myself with a fling here and there. Mr. Robertson particularly reproaches me with having failed "to meet certain arguments as to the effect of the mother's state of mind and nerves on the unborn child during pregnancy." I have now, I trust, made some amends for an omission which, in view of my two articles *re* Mr. Spencer and of my last article, I thought had not occurred. I supposed that in demolishing the foundations of a principle I had done more than merely to assail its super-structural details. If Mr. Robertson desires me to devote still further attention to the superstructure, I will endeavour to oblige him.

I have had the pleasure of reading several articles from the pen of Mr. Robertson, dealing with polemics and sociology, and displaying an admirable objectivity of treatment. Now I ask him to manifest similar objectivity in dealing with Weismann: to consider the new theory of heredity on its merits, quite apart from the unconsciously transcendental leanings of Mr. Robertson, the sociologist.

CHAPTER VIII.

A Further Reply.*

Mr. Robertson has done what few editors would do: he has allowed an advocate of what he considers—or, rather, I will now flatter myself by supposing, *did* consider—subversive

* The above appeared in the *National Reformer*, July 23rd, 1893.

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and utterly fallacious views, a free expression of those views in the journal he conducts. This procedure is so exceptional and so admirable that it has inspired me with a strong sentiment of esteem for Mr. Robertson. While avowing this much, I must as strongly express a determination to allow no quarter to Mr. Robertson's fallacies. The public has been so long flattered by the illusion that social environment can remodel human nature, that if truth is to prevail he who opposes the doctrine must do more than intellectually convince: he must vanquish the bigotry of prejudice. He is in the same position with regard to one form of "orthodoxy" as is Mr. Robertson with regard to another.

In the issue of July 2nd, Mr. Robertson pleads lack of space, and an objection to "inconclusive rhetoric" as reasons for applying the "closure." Nobody more cordially detests "inconclusive rhetoric" than I do. Conclusive rhetoric, on the contrary, has certain advantages attendant which no advocate can afford to discard. If there be any rhetoric in this article, that rhetoric shall be conclusive.

"I point to Mr. Hiller's explicit deprecation of (*a*) State schools, and (*b*) any attempt to carry State education so far as to select specially gifted children of workers for secondary training at the public cost. How can Weismannism be pretended to involve this?" I have not deprecated State schools. I have only deprecated indiscriminate brain-stuffing. If Mr. Robertson will demonstrate the comparative values to the community of the vocations of the navvy, carpenter, bricksetter, poet, lawyer, journalist, I will tell him why I object to the State's selection for gratuitous advanced education of the children of navvies, carpenters, and bricksetters. Weismannism involves the foregoing questions, because educational advocates, such as Mr. Robertson, assume that what they implant in formed brains will reappear in embryonic brains. "On Weismann's view that every child inherits an infinite number of potentialities, is it not rather desirable that the State should do its utmost

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to develop those potentialities, apart from any question of transmitting them in an increased degree?" To answer this question we must first decide what is the value to the community of each potentiality. The measure of such values will decide how far it is advantageous for the community to develop certain potentialities rather than others. After the community comes the individual: we may then ask how he is affected by the higher education. It must be conceded that the culture of the prospective chancellor would be detrimental to the prospective navvy. Is the potentiality to become an effective navvy less valuable to the community than is the potentiality to become an effective lawyer? Suppose that navvies' sons generally have the potentiality to become lord chancellors, are we on that account to overrun the land with potential chancellors? Does the higher education render men "moral"? Whence come the pious company promoters, the puritanical debauchees, the rascals who are too clever to be "found out"? What class manifests such an intense disgust of life as a class highly educated and necessitous? If Mr. Robertson wants to remedy the evils of over-population, one effective way of attaining his end will be to educate each man into the possession of what he calls "a refined nervous organization." Then, assuredly, the majority of these "refined nervous organizations" will discover that they are too "refined" for this world: the "happy" self-"despatch" will become a fashionable institution! The sum of my contention here is: until society fees the navvy as it fees the lawyer, society cannot afford to provide the navvy's son with the higher education.

"In such a highly-nervously organized and self-conscious being as man the nervous and cerebral system being peculiarly susceptible to environment or experience, variations so produced in that are likely to affect offspring." Assuming that Weismann's monumental achievement, based on the fact that these variations cannot affect offspring, is

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"waste paper," we want Mr. Robertson to tell us how these variations are going to affect offspring *beneficially*. Will Mr. Robertson answer the following questions?

1. Does the potentiality of a mind mean something else than the potentiality of a brain?

2. If it means the same, is not the potentiality of a brain an assimilative and transmutative faculty analogous, say, to that of a liver?

3. Have we any reason to suppose that by dosing an indefinite number of generations of livers with, say, podophyllin, we shall thereby ensure the evolution of livers with an increased capacity to emit bile?

4. Have we any reason to suppose that by "dosing" an unlimited number of generations of brains with, say, mathematics, we shall thereby ensure the evolution of brains with increased capacity for emitting mathematical demonstrations?

5. Shall we not, in each case, assuming any hereditary effects to occur, as probably as not secure the evolution of an organ degenerate because ill-adapted to its environment?

Referring to my quotation from Weismann *re* "maternal impressions," Mr. Robertson remarks, in the issue of July 2nd: "It is characteristic of his mental habit that by merely quoting a general denial from Weismann he thinks he has disproved a particular suggestion." The quotation was made to disprove the following remarks by Mr. Robertson: "The cases of nervous trouble set up during gestation are so very commonly and confidently alleged that unless he expressly disputes them I will assume Dr. Weismann to admit their occurrence" (June 4th). "Yet he" (Mr. Hiller) "does not seem to deny the general statement as to results *in utero* of temporary conditions in the mother." The issue here is that Weismann explicitly denies that on which Mr. Robertson builds his main argument. "The denial" (Weismann's) "in any case has

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apparent reference to the production of obvious somatic results from maternal impressions, not to the effects of mental conditions on nervous development *in utero*." The above passage, in my opinion, involves an absolute confusion of ideas; indeed, had it not been written by Mr. Robertson, I should have attributed it to one of those pretenders who presume to discuss Weismannism without having mastered even its rudiments. To infer, as does the above passage, that "nervous development" is *not* somatic development, is, in reference to Weismann's biological theory, nonsense. Weismannism knows no distinction between "obvious somatic results" and "the effects of mental conditions on nervous development." The only "somatic results" recognized by Weismann are effects on the soma. The soma is all except the germ-plasm. The nucleus, a comparatively minute part of the ovum, contains the germ-plasm. The rest of the egg is soma. From the first segmentation of the egg to the mature embryo every product of development is soma and germ-plasm, latent and in various states of disintegration. Accordingly, the nervous system is soma, and "nervous development *in utero*" is an "obvious somatic" result. Mr. Robertson infers in one sentence that Weismann denies "obvious somatic results from maternal impressions," while in the next sentence Mr. Robertson infers that Weismann does *not* deny them!

"On the other hand, I desire readers once more to notice that Mr. Hiller has not a word to say on the crucial issue: How comes it that the same parents procreate children with extremely different characteristics? The evasion is significant. Over that issue Weismannism is helpless."

In the foregoing survey of Weismannism, the technical details essential to the full comprehension of the following statements are discussed.

The reason why "the same parents procreate children

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with extremely different characteristics" is that each ovum and each spermatozoon (female and male bodies engaged in procreation) contains varied combinations of ancestral hereditary elements or "determinants." The existence of these hereditary elements, as *individual organisms*, is demonstrated with masterly logical force and by conclusive empirical evidence by Weismann. No two human ova or spermatozoa contain the same combinations of these hereditary elements. But, even were such absolute similarity ever to occur, a further process—the extrusion of "polar bodies," which takes place in the mature ovum and spermatozoon before they can co-operate for reproduction—ensures still further diversity than that involved in the original combinations of hereditary prime constituents of any two spermatozoa and ova in the same parents. The reason that this further diversity ensues is that the extruded "polar bodies" contain different combinations of hereditary constituents at each successive extrusion from ova and spermatozoa. Thus, not only are the original hereditary combinations of each ovum and each spermatozoon always different, but further diversity ensues through the elimination, before each act of reproduction, of a certain number of diversified hereditary constituents from the spermatozoon and the ovum. I hope I have said enough, if not to explain the phenomena, at any rate to prove that "over that issue Weismannism is" *not* "helpless," and that Mr. Hiller's "evasion" was mainly "significant" of his tender regard for Mr. Robertson's valuable space!

"I believe that thought and emotion are phases of the universal energy—that energy is one. And as I believe that an idea is a phase of energy, so do I believe it sets up reactions. Something" (a useful word—something!) "sets up an idea in the mother; the idea reacts through her physique on her offspring." Now, I will call the reader's attention to my comparison above of a liver with a brain. Let us see how Mr. Robertson's profession of faith works

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out. The "universal energy" which "sets up an idea in the mother," capable of reacting "through her physique on her offspring," has also set up the action in the liver. In the one case the "phase of energy" is the emission of an idea; in the other case it is the emission of bile. Having obtained our analogies, let us now apply them.

According to Mr. Robertson, a certain environment enables a mother to intensify the assimilative and transmutative faculty of her brain; or, let us say, stimulates that brain in a certain direction which Mr. Robertson is pleased to consider desirable. According to Mr. Hiller, a certain drug is the "environment" which stimulates another organ. Now without reference to Weismann, I ask Mr. Robertson to prove, by scientific ratiocination—no transcendental philosophy admissible—that the brain-environment and the liver-"environment" have not strictly analogous effects on the respective organs. Then I ask him for scientific reasons—no masked transcendentalism—why the brain-environment, but not the liver-"environment," should hereditarily affect posterity. If he maintains that both environments hereditarily affect offspring, I ask him to demolish Weismann's masterpiece. When he has done this, I ask him to demonstrate why, granting the transmissions, the effects should necessarily be analogous to the influences; why the excitation of certain faculties in one generation should involve their intensified evolution in another? If Mr. Robertson cannot demonstrate such analogy between influence and its effect on posterity, though he demolish Weismann and scientific psychology, he will be but a little nearer his goal: the establishment of a doctrine that the human type, apart from the individual, is beneficially modifiable by "good," and prejudicially modifiable by "bad," environment.

In concluding my argument, I may observe that Mr. Robertson's process of reasoning to his conclusion of a nervous effect in the human animal distinct from cognate

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effects in other types, is entirely eccentric from the procedure of the most determined *scientific* opponent of Weismannism—it is essentially extra-scientific; and on that account, if on no other, the onus of proof, as Mr. Ball observes, rests with Mr. Robertson. I may fitly impress on him, as he has, unfittingly I think, impressed on me, that convulsive reiterations of a proposition are not proofs. Where Mr. Robertson seems to suppose he has "shown things, he has simply said them."

* Since I sent the foregoing to Mr. Robertson, he has again involved me in his controversy with Mr. Ball. Under these circumstances, I am compelled to encroach further on the space of the *National Reformer*. Mr. Robertson writes: "Mr. Ball appears to suppose that when he intervenes in a discussion its avowed original motive ought to be subordinated to that on which he intervenes. It shall certainly not be so in this discussion, which began on the express issue of the bearing of Weismann's biological doctrines on certain socio-political doctrines laid down by one Weismannite, Mr. Hiller." The only "socio-political doctrines laid down" in my book, as axiomatic, are exactly defined by Mr. Ball, in these words: "On Weismann's theory, the inheritance of the effects of use and disuse is impossible; therefore, the effects of education and habit, including of course, Board School teaching and discipline, cannot be transmitted by heredity." I am extremely gratified that Mr. Ball, by the weight of his scientific testimony and reputation has so fully supported me in this contention. Candour of the sort, if generally characteristic of scientists, would render the propagation of "orthodox" superstitions a more difficult feat than at present. Beyond the original issue, Mr. Robertson has seen fit to raise an entirely distinct one: is it expedient to provide indis-

* The above postscript, referred to in the introduction, was sent to Mr. Robertson. He declined to print it.

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criminate and gratuitous advanced teaching? This involves considerations quite outside Weismannism, and Mr. Ball exercises a perfectly legitimate discretion in declining to contend for what, in the ultimate issue, must be a mere matter of opinion. On the other hand, I have accommodated Mr. Robertson with my views on the matter, and am quite open to conversion to his views so soon as Mr. Robertson provides the necessary reasons. Hitherto, he has conspicuously evaded affording those reasons. "Finally, Mr. Ball's account of the issue as between Mr. Hiller and me once more sets aside altogether the Weismannian admission that germ-plasm *is* modified by environment. I answer that, in terms of Mr. Ball's own admission, *effects of education and habit* (*on germ-plasm*) *can be transmitted by heredity*." Mr. Ball has over and over again shown that inherited effects on germ-plasm and non-inherited effects on *soma*, of environment, are totally distinct matters. It is essential to Mr. Robertson's preconception that they should be confounded; so, with forensic skill, he juggles them into identity. What "sets up colour-changes in fish" has set up colour-changes in the butterfly's wing: nutriment, in its widest sense, and natural selection, so operating that those organisms issuing from determinants containing arrangements of biophors corresponding with the particular colouring, shall prevail in the struggle for existence. It will be observed that natural selection is here an essential factor. But, putting aside all other considerations, natural selection is unavailable under present social conditions in the case of the supposititious transmissions in civilized man. This is an all-important point which seems to have escaped the attention of Mr. Robertson.

The colour-changes in butterflies' wings are strongly corroborative of Weismann's theory. If they had been produced by climatic effects acting *through the soma* on the germ-plasm, alternating colouring according to temperature

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would not occur; the red variety, if exposed for a single generation to the higher temperature, could not give rise to the black, because the particular colouring assumed by the anti-Weismannite to be impressed, through the soma, on the germ-plasm during thousands of generations, would have rendered that germ-plasm quite irresponsive, during a single generation, to the higher temperature. Experiment proves that the colour-variation is, *at once*, attained—though in a much modified degree—by the exposure of pupæ of the black variety to a lower, and of the red variety to a higher temperature. This shows that the germ-plasm is directly affected by temperature, and that the colour-change has *not* been produced *through the soma*. Now, in the changes assumed by Mr. Robertson to occur through social environment, the effect must be produced *through the soma*: it must be transmitted backwards through the brain to the germ-plasm. We can readily understand why heat may directly affect the germ-plasm; but, to talk of "consciousness," "culture," "social environment," affecting the germ-plasm, except through the brain, is to talk nonsense. Abstract terminology doubtless affords advantages to Mr. Robertson, but, it is sadly liable to muddle the discussion. What is now desirable, is that Mr. Robertson defines, in the language of science, such terms as "culture environment," "mental conditions," "consciousness." In the meantime, I will call to his mind this proposition stated at the end of my book: "That consciousness is the product of specific nerve-irritation to which the individual is not discriminatively sensitive until such excitation has been transmuted by co-operation of successively active cerebral areas." Then, we come back to the main proposition which Mr. Robertson affirms and Weismann denies: that the effects of use and disuse are transmissible by heredity. Assuming Mr. Robertson to be correct and Weismann wrong, I again refer Mr. Robertson to the obstacle which I have, throughout this controversy,

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emphasized: that he has not given us a scintilla of reason for assuming that "good" influence produces "good" effect. Only now does he seem to recognize the gravity of the objection, and attempt to dispose of it by a vague assertion that we may "reasonably surmise" on this point. I utterly deny that we may "reasonably surmise," and, even could we do so, that reasonable surmise is, under the circumstances, at all adequate to establish the thesis.

What chimeras we are invited to accept by abstract terminology will be evident from the following: "If the factor of differences in nutrition among parental elements be put as the explanation of differences of character in children of the same parents, I reply once more that we want a cause for the differences of nutrition. My thesis was and is that the determining conditions are mental." We are here told that the cause of the differences of nutrition of certain elementary constituents of germ-plasm is the energy exerted by certain products of disintegrated germ-plasm: in other words, the descendant radically modifies the ancestor!

Assuming that the energy of a brain may thus modify the life-conditions of primitive protoplasmic organisms from which a future brain shall proceed, why may not the energies of liver, lungs, kidneys, heart, muscles, exert similar influences? Why should not the glass-blower, the navvy, the athlete, the conjurer, procreate peculiar types of offspring? We have many successive generations of factory operatives—is there any well-defined peculiarity of development established among such families? Personal observation in a large manufacturing centre has not afforded me an instance. Is not the evidence altogether in the opposite direction? Does it not rather prove that the excessive development of faculties in one generation tends to destroy them in the next? How many talented men who have assiduously applied their faculties have procreated their like, compared with those whose children have been,

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if not degenerate, at any rate commonplace? If common experience could prove any effect on the germ-plasm of mental conditions, it would seem to prove that high achievement by the individual involves degeneration in offspring: that nature will have her own average to prevail. As common experience and scientific research thus establish the same conclusion, let us sacrifice what we *want* to be true for what *is* true. Let us be rational.

SOCIAL EXPEDIENCY.

CHAPTER IX.

THE doctrine formulated, and, he believes, established by the writer, that man will think and act solely in conformity with his physical conformation and environment; that this latter will operate merely on the individual, without, in the remotest degree, affecting the innate tendencies of his posterity, and that the effect of this environment on the individual, under the most favourable circumstances, is merely that of enabling him to conceal, without obliterating, the endowments opposed to this environment, has naturally aroused considerable indignation among that large class who have, all their lives, been industriously testing every conclusion by their own subjectivity, and glorifying themselves for the good things they owe to the chances of evolution. The dignity of these worthy folk is naturally affronted by the latest truth which science has placed beyond the pale of reasonable doubt. To these worthy people I can offer scant consolation, nor am I, to be candid, much concerned to console them. Time and experience will probably inure such malcontents to the hardship of realizing that they are but respectable, very respectable, machines, and much added humility may be theirs through the realization.

To another class of critics I am more concerned to justify

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the new truth and to display some of their misconceptions. These critics seem to be troubled, not so much on account of their own nobility, as on account of a certain convention, which they call morality. They see in the new doctrine a subversion of this morality. Something like this is their process of deduction: If man is a mere machine, what is the use of striving? If we are bound to do what we do, why shouldn't we let things drift? Why should the policeman trouble us? Why should lazy louts go to the wall, knaves to gaol, but honest men prosper? Now, from this point of view the new doctrine has, it must be owned, an appearance not altogether pleasant. Let us see whether the point of view is not, more than the doctrine, to blame. But, first let us be quite clear about this: if we try to shut our minds to the new truth on any grounds except those of reason, we are trying to achieve the impossible. In these days, we must live out of the world, or we must accept the demonstrations of science. Therefore, it is puerile for any rational adult to delude himself by the idea he can reject demonstration merely because it clashes with what he conceives as "morality," and prevents him from compounding with "conscience" by dealing with his "crooked" fellows, for the time-honoured reasons, in the time-honoured fashion. He cannot resist reason. Whatever be his preconceptions, so soon as scientific demonstration is available, he must accept it. In this year of enlightenment, there is probably a sane man who has been to school, ready, in his own opinion, to prove the earth a plane. In a few years we shall have a similar rarity in him ready to demonstrate "free-will"!

For ages, criminals have paid a penalty for defective organism, or rather, we may say, for organism divergent from a certain normal standard, which Darwinians call "fit," or well adapted to its environment. Are criminals still to be punished when it is demonstrated to society that these types are the inevitable product of an agency beyond human control? Now, before we can attempt to answer

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this question, we must banish from our minds the conventional conception of morality and must substitute for it the term social expediency. We must cast away the shackles of metaphysics, by which centuries of tradition have enslaved us. The conventional morality is absolutely unknown in nature, outside human subjectivity; it is a measure of human conduct entirely dependent on and originating from social experiment; it has varied in every age and country; it is varying with every fresh day that dawns on humanity; it is, by the latest scientific research, demonstrated a myth. Social expediency is a definition which will enable us to mentally grip the issues which the new truth compels society to face. With "social expediency" as our guiding conception, we are in a position to enforce what is conformable with the drift of evolution, otherwise, what is advantageous to the individual and to society, by appealing with a logical and exact expression, to the understanding. The child, into whose mind has been instilled all that this term conveys will have a clearer perception of the importance of what we call virtues, than he could derive from conventional teaching; as his years increase, he will more vividly realize the inevitability with which its dispensation compels society to maintain social expediency. Even the criminal, spared the jargon of transcendentalism and informed that society fights him on the simpler issue, will become dimly conscious that might has more right in it than was "dreamt of in" his previous "philosophy"!

Society, like every other organism, is a product of evolution. Further, just as the agglomeration of living cells we call a man, has a corporate existence external to each individual cell, so has society a corporate existence external to each individual man. The individual cell may suffer and perish, still the human organism lives. The individual man may suffer and perish, still society lives. But, if conditions essential to the existence of the human organism

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become seriously assailed, then the organism perishes. So with society: destroy the conditions of existence, society perishes. Transcendentalism has no more connection with the conditions of existence of the body-social than with those of the human organism.

Social expediency is the term which concisely expresses the conditions under which society exists. Therefore to enforce social expediency is a manifestly vital matter to society. If it be "immoral" to punish the helpless criminal, still it is socially expedient that he be restrained from preying on society. Therefore, society, perforce punishes the criminal. The law of survival of the "fittest" is stronger than transcendental "morality"; society realizes that self-preservation, otherwise selfishness, is the first law of nature and acts accordingly notwithstanding that, according to transcendentalism, it is "immoral" to punish a helpless man for what is inevitable to his organism. It is sad that this visitation should afflict the knave; so is it sad that phthisis should afflict the honest man. Nature knows no pity. Society, as a product of evolution, is nature's offspring and obeys its parent. When we contemplate the misery around us—the helpless children cursed by poverty and its incidentals—and contrast this with the pomp and luxury of another section of society, we may well ask whether sophistry, rather than reason, be not concerned in that nice discrimination which would question the right of society, under the new conditions imposed by recent scientific research, to punish the criminal, not as a penalty for offence against "morality," but because society believes that it, not the criminal, is the "fittest to survive."

Suffering—according to our limited conceptions: needless and "immoral" suffering—is the birthright of the great mass of animated organism. It looks very like hypocrisy to close our eyes and button our pockets while destitution tortures millions, yet affect "moral" solicitude because a few thousand "unfit" organisms are prevented from running

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amuck at society. Such discrimination savours too much of Catholic "Hermeneutics" to be altogether acceptable to the average intellect. In this respect the old doctrine of a "free" *ego* has a great advantage over the new verification: it enables us to consign the criminal to his doom without troubling our "consciences." To be able to inflict pain in a strictly conscientious manner is no doubt a fine prerogative! Now, as to the other point: why should we strive for "good," if we are but machines? Why should not we let things drift? The simple answer to this question is: just because we *are* machines we *must* strive. We do not argue with ourselves *why* we strive; we simply obey the inner promptings of our nature. Our cerebral machinery responds to its environment. When our brain is normal, the consequence is that our striving tends in the same direction as that of our fellow-men: in other words, we work harmoniously with the other parts of the greater organism, society: we conform to the drift of social evolution. But let it be clearly understood, that, apart from innate tendency, the individual has no power of selection whitherwards he shall strive. Environment, after innate tendency, is the sole determining factor in respect to human effort. We strive as our fellows strive, and what we strive for is purely a matter of evolution from the effort of our forefathers. The savage, like his fellows, strives to kill as many of his enemies, as possible. The model citizen tries, in theory, to benefit his enemies! Give one the environment of the other, they would exchange activities. Granted that the cerebral conformation of the one differs from that of the other; still, the citizen's child, brought up by savages, would act as a savage. He would learn, not *inherit* his life-vocation. We do not regenerate by our civilization—not a single innate characteristic has been annihilated or created by all the devices of men—society simply evolves its own destiny, and men, like clay in the potter's hand, take their characters from a force

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outside themselves. To the sociologist, it will sound rank heresy to assert that education will not regenerate humanity. As well flaunt a red rag before an angry bull as tell the sociologist this! However, after his first shock of indignation has passed away, we may perhaps be able to reconcile even him to this pronouncement. More especially may we hope for this consummation as the sociologist is generally a man of some mental calibre. What about our definitions—is there any confusion here likely to set him and the evolutionist at logger-heads? The evolutionist believes that the basis of thought is physical energy. The advanced sociologist agrees. The evolutionist's conception of regeneration infers a new physical birth. Here, apparently, the offended sociologist infers something else, or why his wrath? If he is a metaphysical sociologist, we refer him to our book for conversion. If he is an up-to-date sociologist, he will now discern the root of discord, and, we trust, bury the hatchet. The rational evolutionist, like other mortals, judges many things subjectively; likes and dislikes affect him as they affect others. Though, in his objective moods, he cannot help confessing that what he likes to think progress may, in the great cosmic scheme, mean merely change, he is nevertheless prepared to fully appreciate the fruits of education and sociological experiment. At the same time, he will stoutly maintain that these are absolutely powerless to modify organism, and, consequently, to regenerate humanity.

In connection with the foregoing, it may be useful if I now cursorily notice an attack on my propositions from the avowedly transcendental side. Dr. F. R. Lees publishes what he calls "an occasional pamphlet devoted to the study of mental, moral, and social philosophy," and entitled "The True Thinker." In the number for March, 1893, occur the remarks quoted below. All have been already answered in "Against Dogma and Free-will," but, as they are characteristic of much of the conventional nescience with which I

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have been favoured as criticism, I will traverse old ground to again dispose of them. "Of course, everybody *does* what, at the time of doing, he thinks best for his own ends—*i.e.* he does what he *wants* to do: but that is precisely what most people mean by 'freedom.'" Now, one of my points is that this is "precisely what most people," especially theological people, do *not* mean by freedom. The fundamental proposition of theological people is that we have freedom to do what we do *not* want to do, and that we may propitiate Deity by so acting. As Dr. Lees grants that everybody does what he wants to do, I recommend him to ascertain what causes everybody to want to do what he does. By studying the psychological arguments advanced in this volume, Dr. Lees may acquire the necessary information which will convince him that the "wanting" is merely automatic response to extraneous excitation. The dog does what "he wants to do," yet I assume that Dr. Lees will not assert that the dog has "freedom." Now, it is scientific demonstration that, between the dog's freedom and man's, there is merely a difference of degree, not essence.

"Without thinking-power and a choice among possible actions, moral responsibility is unthinkable." Dr. Lees may next, with advantage, devote a little study to "moral responsibility." He may find, if he will really look for them, a few facts stated in this volume likely to convince him that *his* "moral responsibility" has no existence outside the brains of ignorant doctrinaires and other people who don't take the trouble to learn what science can teach them. The dog has "thinking power and a choice among possible actions." Does Dr. Lees endow the dog with "moral responsibility"? "This truth" (as above) "is acknowledged in the distinction between crime and insanity." And this "distinction" is false inference bred of premature metaphysical assumption. Metaphysics should have awaited scientific demonstration before formulating

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its "distinctions"! "Ideas and motives *are* ourself.". Exactly. And these "ideas and motives" are inflexibly determined by physical structure, just as is the tune sounded by the "hurdy-gurdy" determined by *its* structure. How these metaphysicians will blind themselves by their own subjectivity!

"It is not science but confusion that makes action done by foresight the same as action done by wires and machinery." Again I must prescribe a scientific diaphoretic for Dr. Lees! The transcendental temperature must be reduced! Abstractions, such as "foresight," are ominously symptomatic "visions" to which such cerebral conformations as Dr. Lees', aided by a "philosophical" training, seem prone. A strong dose of real science will relieve the patient. On recovery, he will perceive that his "foresight" was an illusion and that the reality is unconsciously resuscitated experience.

"Our 'choice' for anything is free-choice—and to stop it is 'compulsion.'" Our "choice" is not "free-choice," but is absolutely determined by our cerebral "collodion-plates." This choice is never "stopped" during the conscious life of the organism. Outside influence may affect our cerebral "tonality," causing organism to respond to a different excitation. Still, there is no "compulsion": organism does as it "chooses."

"Now, our senses never do delude us." Our senses are continually deluding us: the more objective experience we acquire, the more instances of such deception we accumulate. Our senses tell us that light is white, and dreams tell us that ogres are dismembering us. Both tell us "facts," *while the particular subjectivity persists.* But, this subjectivity only persists so long as more perfect (objective) experience does not contradict it. When thus contradicted, we call our former "facts" illusions.

Of course, by a little "logic-chopping," we may still show that our "senses never do delude us," even when

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they tell us that ogres are dismembering us; that light is white, the earth a plane, or a globe with the sun revolving round it. We will grant those ponderous Butlers and Hamiltons their dialectical "facts," and still maintain that had those mountains of logic known what we know about cerebral action, they would not have encouraged their mole-hill successors to pit mere dialectical cunning against scientific psychology, physics, and biology.

That our senses do directly mislead us is readily demonstrable, as already explained in "Against Dogma and Free-will." We will adduce a few more illustrations. A smoker thinks he tastes the tobacco-smoke issuing from his pipe. In a tunnel, he cannot tell, though sucking his pipe, whether the tobacco is alight or not (assuming no glow visible). He only "tastes" the smoke when he sees it. Again, we think we taste the difference between an apple and an onion. Blindfold our eyes and close our nostrils, we can scarcely distinguish between the apple and the onion. That our sense-perceptions—our likes and dislikes—are merely idiosyncratic response to external stimulus quite unreliable as determinants of objective reality, is, in a multitude of ways, easily demonstrable. Odours disgusting to us are delightful to many other animals. Putrid flesh attracts flies, crows and vultures. That what we perceive by sight, hearing, touch, taste, smell, is quite unperceived by many other animals, and *vice versa*, that what they perceive, we cannot, is, again, demonstrable by many well-known facts. Thus, every "mental" effect (including in the term "mental effect," every experience, from the highest intellectual to the lowest sensuous) to which our organism is responsive, is purely an experience peculiar to our own limited perceptivity, and always to be rejected when contradicted by a wider and more objective experience. Of course, carried to its logical end, this proposition means (putting aside the question whether any of our experiences have objective reality), that

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even the ultimate verifications of science are merely subjective. Granted; still we have no rational choice but to accept them as being a further evolutionary step towards the perception of "absolute reality," as distinguished from sense-realism. Inasmuch as it convinces our intellectual, as distinct from our mere sensorial perceptivity, we are bound, under our present organic conditions, to believe that scientific verification, more completely than any other, eliminates the "personal equation." That, under the present dispensation, a higher than the scientific method of investigation may enlighten humanity, is rationally inconceivable. That such an eventuality as the supersession of the scientific method will, at some distant period, be the issue of evolution, anybody and everybody may, as he chooses, deny or affirm. Whether he denies or affirms will be simply the manifestation of his own subjectivity, and therefore quite unreliable to forecast the issue.

Of course, we know that many people, even in these days, affirm that the scientific method is an infamous infringement of the rights of a certain pre-existent method. We are told that a certain Power has, for ages, enabled men to verify by a method infinitely more reliable than is the scientific. We are told that to follow the scientific method, rather than this antique method, is to court an eternity of misery. All that we followers of science can say for ourselves, under the untoward circumstances, is: it is hard that this Power has endowed *us* with certain faculties which compel us to discard, even with gibes, this antique method; it is hard that organism compels us to realize that the "verifications" of this antique method are tissues of ridiculous fallacy and imposition; it is hard that, to us, the high priests of this antique method appear either deluded enthusiasts or deluding humbugs.

As men used to looking facts squarely in the face and consequently apt at hating mendacity, we followers of science cannot reconcile the worldly compensations of the high, and,

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not infrequently, of the low, priests of the antique method, even with the fallacies, to maintain which, this method is supposed to exist. If we may venture to state our proposition in a more unglozed manner than, in these days of refinement, is fashionable, we would assert that many of us followers of science, whose perceptivities are tinted with idealism, would feel less "moral" compunction in accepting any well-paid sinecure, say, for zealous "party" hack-work, than we should feel in accepting, with its worldly concomitants, the archbishopric of Canterbury. Our organisms are fired, not so much against the "verifications" of this antique method (we rather commiserate these "verifications") as against the affront to our innate sense of honesty offered by the potentiality of carnal affluence of these particular high and low priests, contrasted with the "verifications" for which only, they profess to live. We are compelled to recognize in this contrast, the very apotheosis of sham: sham in "verification," sham in humanity! In fact, only on the theory of unavowed but well-understood sham are we able to account, as rational action, for the voluntary illustration of this contrast, by these particular priests.

The foregoing are merely our subjective views with respect to the priests of this antique method. In our objective moods, we smile at it all, as we smile at the peripatetic quack's grave countenance while he diagnoses the old lady's symptoms and prescribes his nostrum. We know human nature! We followers of science might, one and all, have been high or low priests of the antique, but for a few little accidents which befell us before we were born, and a few big events which happened before and after we were born!

Now let us glance at the contending claims of the antique and modern methods, from another standpoint: let us leave the follower of science to simmer in his self-conceit, and try to ascertain how this antique method is likely to fare in the

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near future. Let us see how matters stand between these high and low priests and that great class who but desultorily snap at the piquant facts which science now and then offers their curiosity.

That English society has now, through a hundred channels, been disabused of its ignorance respecting certain antique records on which are based the priestly pretensions, is, we submit, a reasonably acceptable proposition. As another such proposition, we submit that the effective part of English society has, for some years, tolerated priests, not for the sake of the "truths" they propounded, but because, in some mysterious way, these priests were supposed to "make for righteousness"; in other words, these priests tended towards the preservation of those sacred "rights" by which the selfish "haves" had been able to thrive at the expense of the selfish "have-nots." But mark: these selfish "have-nots" are now dangerously exemplifying a method of selfishness diametrically opposed to that of the "haves," and the "have-nots" find that their method instead of being assisted, is thwarted by the priests. Consequently, these "have-nots" manifest their concern with the priests mainly in the direction of compelling them to prove their honesty, or "shuffle off"! Not because they have any more abstract veneration of honesty than have the "haves," do the "have-nots" thus behave towards the priests, but merely because they see, in the selfishness of these priests, a great insult to their own selfishness. Now, let us glance more specifically at the priestly pretension so that we may ascertain how these "have-nots" and their unidealistic appreciation of honesty are likely to affect the priest. Thus, we shall obtain a probably accurate forecast of how "social expediency" is going to treat the priest.

We are told that there are too many candidates of poor, and too few of high, attainment, for the priestly office. Further, we are told that (theoretically, we suppose) the

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only incentives inspiring these candidates are a sense of the truth and supreme importance of the "verifications" of which they aspire to become authorized expounders and exemplifiers, and a conviction that, unless these "verifications" are purveyed to mankind by priests, eternal torture will be the penalty to most of us in a future state, for involuntarily entering this state of existence. Now, the attentive observer must be struck by two glaring flaws in this scheme of emulation which render it, in these days, inefficient. First: men do not believe the "verifications." Second: men do not trust the priests. As already stated, when only one selfishness, that of the "haves," was an efficient factor, this mistrust of both "verification" and expounder need not have been a matter of serious concern to the latter—apart, of course, from any idealistic factor energizing in his conformation. In other words: merely considered as a person who desired to jog along comfortably and sumptuously, diffusing a saintly atmosphere of aspiration for the next, and resignation to this, life, and, here and there, commissioned to administer a gentle rebuke to humanity, the priest need not have alarmed himself merely because the selfish "haves" found it necessary to blink their eyes to a few imperfections in his armour of immaculateness. But when, as now, the selfish "have-nots" (become formidably selfish) have also to blink *their* eyes, and are rapidly resolving *not* to blink them, it becomes evident to the discerning observer that the priest will have to prove the truth of his pretension that his "verification" has made him not as other men: that selfishness is eliminated from his nature. He will have to prove that he is honest by sacrificing his material advantages. When the priest has thus done penance, the unthinking and the ignorant, a large part of society, will probably again coddle the priest and applaud his sacrifice. Moreover, when the bishop and curate earn the same stipend for exemplifying and expounding the doctrine of

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self-mortification, even scientists will see a certain merit in bishops, apart from their "verifications," and—a great consideration—there will be vastly fewer embryo candidates for the archbishopric of Canterbury! It will be needless to emphasize to the archbishops, bishops, archdeacons, canons, and lavishly-endowed rectors, the beauty of an arrangement which will enable them so unequivocally to exemplify the meaning of their doctrine; which will enable all of their class to obtain the essentials of reasonable comfort (although this is more than according to the strict interpretation of their doctrine they have a right to demand); which will leave a large residue applicable to ameliorating the lot of a multitude of their fellow men who get less out of life than would the ideal Christian, without having the ideal Christian's supposed recompense in "this life and the next"; and finally, which is probably the only means of giving a further lease (in a highly attenuated form) to those "verifications" which the aforesaid high priests consider vital to humanity.

As the pretensions of the high priests are irrevocably bound up with the selfishness of the "haves," and as this selfishness will, we may reasonably assume, succumb in the coming struggle, we may accordingly infer that the future "social expediency" will plunder or (if the term offends a nice sense of propriety), will compel the high priests to allow their emoluments to be applied to the benefit of the low priests and the community in general—not forgetting the high priests themselves. Then, probably, will begin to manifest itself the religion of the future.

Inasmuch as its professors will thus, at any rate, give bond that they believe what they propound, this coming religion will probably be better adapted than was the old, to its environment. There can be no reasonable doubt that sincerity, whether based on fallacy or truth, has a wonderfully impressive effect on the average man, who likes to be driven by emotion. The *summum bonum* of religion

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will arrive when emotion and reason drive in the same direction. For a considerable portion of the life of humanity they have been driving in opposite directions, consequently half their energies has been wasted. Science, by tending towards a reconciliation of the two, will thus, instead of destroying religion, probably be the means by which will be manifested a higher religion than the world has hitherto known. Of course there may be an interregnum, apparently void and chaotic, but let us hope that our limited capacities, if able merely to discern chaos, may yet reconcile us to it with the anticipation that, from the upheaval, a more perfect order than before possible, shall be evolved.

The writer has already expressed the conviction that religion will live as long as humanity, and, on the other hand, that no religion which affronts human reason is tolerable. Holding these convictions, he has been impelled to aid the downfall of a religion which is no longer a living power making for what he likes to conceive progress. He believes this religion adverse to the best interests of humanity, because: it appeals no longer, as truth, to the human understanding; it opposes all that is best in human nature by exercising hypocrisy in every man, woman, and child who professes it; it is the very antipodes of honesty, and honesty is the main attribute essential to the higher, and conspicuously absent from the present, social development.

As the reader is now aware, it has been attempted to connect the writer's application of Weismann's biological theory with a certain conventionality known as Toryism, and the writer has repudiated any connection with conventional politics. The only politics he recognizes is "Social Expediency." This, under a number of fanciful names, is the factor by which society has been and is being moulded: it is, in other words, evolution, or the groping of the social consensus towards fresh development. In

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the writer's opinion, the inevitable and near issue of this process will be a radical modification of the ties which have, for centuries, bound together civilized men, and, he is convinced, that, to science, the enlightened portion of humanity will be indebted for that impelling energy which will enable it to reconcile itself to the new evolutionary process. By proving that the intrinsic merit of one individual is absolutely the same as that of another, all those fantastic distinctions based on the assumption of unequal human deserts must as inevitably dissolve away as does darkness at sunrise.

Under whatever phases the new evolution may manifest itself—whether in the nationalization of land and capital, the universal imposition of individual service to the State, the limitation of the power of individual accumulation of wealth —the prime propeller of the new order of things is Science. That mistakes may occur: that too eager enthusiasts may prematurely induce society to undertake rash experiments, thereby ensuring temporary disaster, is one of the inevitable incidentals of a radical innovation vitally affecting the selfishness of humanity. It is the province of objective observers to endeavour to curb their own sympathies, and so to guide and moderate the new forces that the inevitable issues shall be achieved with the least possible rupture in the continuity of social development. After all, the present generation live for themselves as well as for posterity; and though some enthusiastic propagandists would have us believe the contrary, selfishness is not the endowment of one more than of another section of the community. Transform the needy "socialist" of to-day into an acred baronet, to-morrow he will be as staunch a champion of the "rights of property" as any crusted Tory in the land! Let us move on the glacier rather than on the avalanche! Let us have movement but not cataclysm!

In these days society can scarcely be said to exist in unstable equilibrium; rents and fissures show, only too

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clearly, that the internal play of forces is so ill-balanced as to be imcompatible with equilibrium: the ferment of thought which, for half a century, has been stirring humanity, has, in these days, culminated in a shifting of forces involving new distribution of pressures which must adjust themselves if the machine is to be preserved. Whether such facts be readily recognized and submitted to by a certain section of the community will decide the vital point whether the new adjustment is to occur without catastrophe.

The great achievement awaiting execution by the "social expediency" of these days is to effectually counteract the innate selfishness of the individual by the innate selfishness of the body-social: in other words, to make more manifest than ever the individuality of society as distinct from that of the unit. Men are evolving more extended unity in social structure, as did the primitive cells in physiological structure. As these latter coalesced to form the million-cell individual, so are men destined to coalesce to form the million-man individual.

As long as power was concentrated in the so-called higher classes, only one selfishness dominated society: the selfishness of the well-to-do. What opposed this selfishness was the *vis inertiæ* of an impoverished residuum and a toiling mass not educated to see its opportunity and demand more than its daily bread. "Charity" dealt with the former; "capital," with the latter, and so society managed to jog along without too violently straining its foundation-ties. The conditions are now changed; the selfishness of the "have-nots" is capable of coping with the selfishness of the "haves," thanks to the competing selfishness of rival "haves" who, in making bids for popularity, proved themselves the purblind instruments of an evolutionary process destined to give the *coup-de-grâce* to their own power. These opposing forces—the selfishness of the "haves" and "have nots"—are, no doubt, destined to evolve a new

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mean pressure which shall again place society in unstable equilibrium.

Since writing the foregoing, the author has received, in the shape of the latest criticism of "Against Dogma and Free-will," a very characteristic illustration of the vanity bred of sacerdotalism and of the wild shooting with "canister" previously adverted to. Because this critic (see *National Observer*, September 2nd, 1893) *wants* his own type of organism to constitute a break in the continuity of evolution, he, with academic suavity, flatters himself and other susceptible entities, that his and their type *does* break the continuity of evolution. It cannot be too often impressed on such a critic as this and on those responsive to his "dulcet strain," that what they *want* has no necessary connection with what *is*; and further, that religion, to be, in these days, a living force, must be based on a firmer foundation than parochial egotism and selfish aspiration. I am taxed by this critic with belying my professed belief that men are conscious automata, inasmuch as I specifically attack certain principles through the persons who illustrate those principles. I attack priests; but, priests are as much the product of evolution as are those who oppose them. Granted: but they are the product of an evolution now effete and vicious. If I can only put bullets into an effete and vicious product through conscious automata, so much the worse for the automata! When the product is destroyed there will be no automata needing bullets! Academic sophistry may make pretty reading, but it proves nothing. I like priests individually, as much as I like academic critics. Collectively, I think that priests (I won't say also, academic critics. *They* may be useful in speeding my bullets!) are impedimenta of which society had better relieve itself. This critic, further, taxes me with "bad taste marking nearly his every page." As it comes from an academic critic, I take this as a compliment. It is difficult to tread on people's corns with good taste. I have to

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tread on people's corns! This critic, however, achieves the difficult feat: he treads on my corns, with good taste. But, then, *my* corns do not feel crushed, he treads so gingerly! Again, this critic reproaches me because I propound a Supernatural which really holds the universe "in the hollow of His hand," rather than a "supernatural" which is perpetually cajoling, menacing, and wrangling with a number of petty entities which this "supernatural" has so endowed that they are prompted insanely to contest its supremacy. A "supernatural" such as this critic's may seem indispensable to the petty entities retained for the defence of "vested interests"; to the petty entities who imagine they can bribe for front seats in "paradise"; to the petty entities in the thraldom of ignorance, egotism and selfishness; but, to the great mass of thinking humanity, this "supernatural" is soon destined to become one of that pantheon where rest a few thousand "supernaturals," the dead and gone worshippers of which we call pagans.

We trust that the reader will now perceive that the tendency of the author's doctrine is neither to destroy religion nor the foundations of social life; but, that its tendency is to purify the former and to strengthen the latter. "Social Expediency" will punish the forger, the adulterer, the thief, the murderer; only, it will punish them, not as offenders against "morality," but, as representatives of "unfit" types whom it is desirable that society should eliminate, or, as this is impracticable, who must be discouraged, by the compulsion to exercise their innate desire for self-preservation, from exercising those other innate potentialities by which these victims of a dispensation which does not permit children to select their own fathers and mothers, are constituted enemies of society.

In some cases, "Social Expediency" is probably destined, in the near future, to bear more hardly on the "unfit" than does "morality." Thus: the adulterer will be recognized, when, as is often the case, he fatally assails the family, as a

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social pest as well meriting extirpation as does the murderer. To him, under such circumstances, will be meted the murderer's penalty.

To ensure the highest possible (according to our present perceptivity) communal efficiency, it would be necessary that society should carry out the biblical precept respecting the organ or member that offends, by extirpating the "unfit." As an alternative to such a process of immolation, society might, by the stringent regulation of marriage, to a large extent, prevent the existence of the "unfit." As a further alternative tending towards the desirable result, the individual might—were our system of education dedicated more fully to the instillation of vital truths than to the veneering with academic nothings—of his or her own initiative, save society and him or her self the harvest inevitable from the gratification of emotion and animality when that involves the repudiation of reason. To sum up: only when society holds itself responsible for the existence of the "unfit" more fully than it holds the "unfit" responsible for his actions, will society eliminate the "unfit." Only when society recognizes, and acts on the recognition, that "volition" is "bred in the bone," will society completely modify the "volition" of its units. This it will achieve, not by what are euphemistically termed culture and moral incentives, and by penalties for the "unfit," but, by a judicious process of selection in respect to the procreation of its units. When it is considered at least as essential to "polite culture" that the pupil should be taught physiology, embryology, and biology as geography, history and arithmetic, and far more necessary than that he or she should be taught to mangle Latin, Greek, or French, or tamper with art; when every girl and lad can intelligently contemplate the stupendous facts of his or her evolution with a mind divested of the nauseous prudery bred of hypocrisy and ignorance—then, we shall be on the brink of that revolution which shall render men and women sane in "love" and society sound in body.

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CONCLUSION.

Having lately, by the courtesy of some unknown friend, received from America a copy of a high-class magazine called *The Monist*, in which "philosophy" is a prominent item, the writer is prompted, before concluding his work, to add a few remarks on a subject to which some attention has already been devoted.

In this work we have endeavoured to keep clear of "philosophy." What is not demonstrable to intellectual sensualism we are content to leave for decision to the "mental" idiosyncrasy of the individual, feeling assured that, in defiance of all the "philosophies" the world has produced, the individual will here only accept the decision of his "mental" idiosyncrasy.

Those people who profess to weigh-up the universe with the Calculus and their own imaginations; who carry their mathematics about as a draper's assistant does his tape, labour under a great advantage compared with the observing scientist, inasmuch as these mathematical idealists can never demonstrate to one another or anybody else that one or the other of them is right or wrong. A philosopher's lot is not so unhappy as is Mr. Gilbert's policeman's; "nominalists" and "realists" may "nominalize" and "realize" till "nothing but their tails is left" and be none the worse for their efforts!

The wrangling of these schoolmen makes vastly entertaining reading for people who like the gas-light of intellectual sensualism better than the sky-rockets of "inner-consciousness." The humour inherent to the "parry and thrust" of two such giants of subjectivity as a Carus and a Peirce* almost reconciles us to its futility. The writer's subjectivity drives him after Dr. Carus (although he thinks Mr. Peirce the cleverer conjurer), but then, that is merely because he likes to look through Dr. Carus'

* See *The Monist*, July, 1893, for their controversy.

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spectacles rather than through Mr. Peirce's (I would recommend this gentleman to alter the order of two letters in his name). The writer, unlike some people, places an objective value on his "likes," consequently, instead of yielding himself to Dr. Carus, he feels a perverse hankering for the man with the cleverer trick, Mr. Peirce, the magician who has fabricated a nothingness which is a somethingness! Such is the effect of "philosophy" on the writer. He cannot trust himself or anybody else when intellectual sensualism is not available to check the conclusion. What offends intellectual sensualism, organism compels us to renounce. What goes beyond intellectual sensualism, is decided merely by likes and dislikes, but these, unlike scientific likes and dislikes, we are unable to submit to any criterion satisfactory to organism. If Dr. Carus is right, Mr. Peirce is wrong. Both are great philosophers: probably neither is right; yet, nobody will ever demonstrate either wrong!

An article in the same magazine, written by Professor Cope, in its "unphilosophic" appeal to intellectual sensualism, affords a stimulating contrast to the philosophers' duel previously noticed. In this article much is affirmed that the writer advocates in the present volume. Professor Cope's "consciousness" appears a near relative of the writer's "nerve-force" and "life-principle." Though they emanate from subjectivity, such conceptions satisfy intellectual sensualism, *when they are propounded as phenomena.* However, Professor Cope transcends the phenomenal in developing his "consciousness" into *a* deity. The writer cannot understand why men should be anxious to define deities. A deity which designed men to know its characteristics, yet, about which characteristics men should be perpetually squabbling; a deity which designed men *not* to know its characteristics, yet, which characteristics men *did* know; a deity which was powerless or indifferent in regard to men's knowledge or ignorance of its characteristics, would be a poor

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sort of deity. The highest and rational conception of Deity would seem to forbid definition. Whoever publicly propounds definitions of a deity merely exploits the product of his own prepossessions. No prepossessions of a modern, can be intrinsically more valuable than those of an ancient, "seer." Practically, modern prepossessions are the less valuable because they must be the less acceptable to the generality of mankind, to whom antiquity alone is too often the equivalent of verification.

Whatever may be the objective reality or realities implied by such terms as consciousness, nerve-force, life-principle, it is demonstration that the product of the influence on organism of such reality or realities is all that men can practically deal with as a theory-basis. It is, further, demonstration that such product will vary with every responsive organism. Consequently, by it alone, no universally acceptable conclusion is attainable. What is demonstration to one organism is fallacy to another, according to their idiosyncratic response to "consciousness" or "nerve-force." The only possible universally acceptable propositions must be verifiable by empiricism. That a First Cause is, is, so far as research has yet carried us, one such proposition. At least, we may assert that the preponderance of evidence from empiricism appears to the great mass of humanity overwhelmingly antagonistic to blank denial of a First Cause. When, however, we begin to *define* by ratiocination, that First Cause, we cast ourselves adrift on the ocean of "pure reason," otherwise pure subjectivity. Then, the issue is futile. From every point of view, except that of the projector, modern, like ancient, "visions" are fantasies. Professor Cope's deified "consciousness" is merely another phenomenon-god. An emanation it may well be. It is no Deity.

Professor Cope apparently maintains that matter is objectively real; that "consciousness," by entering matter, has transformed it; that "consciousness" is inherent to that

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matter into which it has once entered. This "consciousness" is accordingly tantamount to "vital principle." It seems to the writer that such a theory will not bear the test of fact: "consciousness" and "vital principle" must be distinct factors in evolution, the one external, the other inherent, to living organism. "Consciousness" can only manifest itself subject to the activity of certain peripheral channels of communication between external excitation and the central cerebral system. (See case mentioned on page 41 and the various pathological and experimental examples given in this work.) This *conditional* manifestation of "consciousness" is consistent with the assumption of response by living organism to "consciousness" as an external stimulus, but not with the inherency of "consciousness" in living matter into which it has once entered. It seems to the writer that it is only consistent with facts to treat "consciousness" as an energy external to organism, leaving the evolution of organism, alone, to explain, by the various potentialities of response resulting from progressive cell-agglomeration into highly-specialized structure, the evolution of language and its inevitable consequence: reason.

We have no reason to suppose that mind, as we conceive it, is the highest form of response to energy possible to organized matter. It is quite conceivable that some future type may grasp and verify by intuition what is now only appreciable by ratiocination. Then, "the forms of logic" which Professor Cope assumes as the feature distinguishing "mind" from "energy" would prove insignificant. Facts tend to prove that, when we treat "mind" as a something, essential and inherent, instead of merely as idiosyncratic response to external energy, we are well on the way to self-delusion. No more than the eye, can "mind" see itself, except from a reflecting medium. Given such a medium to "mind," then intellectual sensualism might accept "mind's" account of "mind." Because "mind" cannot project

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itself outside "mind" and there is no medium to reflect "mind," we may as well ask digestion to define digestion as "mind" to define "mind."

"Philosophical" definitions of "mind," like "philosophical" definitions of Deity, are mere products of organic idiosyncrasy. If a man's "philosophical eye" is "colour-blind" he will "see" *his* "mind" differently from the majority of his fellow "philosophers." If his "philosophical eye" is normal, he will "see" as his fellows "see." There is an overwhelming majority of "unphilosophical eyes" which "see colours" in the same way. Hence, we have established satisfactorily to intellectual sensualism what is, say, a "red" impression and what is a "green" impression. There is no approach to such a consensus of "philosophical eyes," hence intellectual sensualism behaves as disrespectfully towards "philosophy" as towards "inspiration."

It has been stated above that organism may, at some future period, grasp by intuition what it can now only apprehend by ratiocination. Some acute commentator (probably a theological one) may reply: why, then, not accept as sporadic anticipations of such future evolution the organisms which have been able intuitively to define the deity of Dogma? The answer to such a critic would be: evidence compels intellectual sensualism to dub these products of evolution, not anticipations of a future, but atavistic reminiscences of an effete stage of evolution. Of course, intellectual sensualism might be quite wrong in this deduction; but, that would be the fault, not of intellectual sensualism, but of the dispensation which compelled it to believe in itself. Sometimes—or rather, very often—organism, nowadays, ostentatiously tries to disown its intellectual sensualism. Then organism shows what a very pretty hypocrite it can be.

When intuition supersedes intellectual sensualism as a normal verifying factor, men will, of course discard intellectual sensualism which, through selection ceasing to operate on it, will become a lost product of evolution. At

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present, men have no means of verifying, except intellectual sensualism. ("Philosophy" professes to have discovered an improved method, but then, "philosophy" is very sanguine!) Intuition, to be, nowadays, effective, must demand very moderate concessions from intellectual sensualism. Many people make valiant efforts to strangle the intellectual sensualism with which they are endowed. That is quixotic enterprise. Many, again, are content to allow their intellectual sensualism to rust, except in so far as it conduces to what men call success. These people often believe that "ignorance is bliss" when knowledge might detrimentally affect the pocket: they are too selfish to know. Even such as they would be too good, to be possible products of evolution, had nature produced none but the type they represent!

In taking leave of the reader, we ask him to try to be impartial in judging our conclusions. Especially, we warn him against the persuasion of his emotions, on the deceptive nature of which we have throughout this work insisted. No doubt, he feels a yearning towards the makeshift of easy acquiescence in what his grandfather was able to really believe, but in which it is impossible for the enlightened adult of to-day to do more than affect belief. Let him carefully consider the evidence we have adduced, then ask himself whether that evidence does not sway his understanding. Let him realize that merely to follow his emotions is but emulating the brute. Let him esteem reason (intellectual sensualism, as distinguished, on the one side, from mere sensorial perceptivity, and, on the other, from mere subjective projection into transcendentalism) as the capital prerogative of man, the only quality which raises him above the brute. Let him accept the guidance of his great prerogative.

For the interested partisan of fallacy, we will briefly recapitulate the main facts which we ask his reason to demolish. Let him spare himself the labour of emotional ebullition; we require less than transcendental annihilation,

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we ask but extinction by disproof of the following scientific verifications :—

1. That man is the product of the commingling of parts of two cells in which are indelibly fixed all the potentialities of the future being.

2. That social environment affecting the human parent cannot affect the innate characteristics of offspring.

3. That social environment can neither annihilate any innate, nor cause to be evolved anything beyond innate, potentiality in the individual.

4. That social environment can modify the manifestation of innate capacity (but not the capacity itself) in the individual, only by involving more or less exercise of that capacity—in other words : social environment can only affect the individual by exciting the exercise of certain potentialities innate to that individual, and opposing the exercise of other innate potentialities.

5. That whether the individual responds or does not respond to social environment depends solely on innate physical idiosyncrasy.

6. That consciousness is the product of specific nerve-irritation to which the individual is not discriminatively sensitive until such excitation has been transmuted by the co-operation of successively active cerebral areas.

7. That such transmutation requires appreciable time for accomplishment.

8. That moral is coincident with intellectual change, "will"-tendency thus fluctuating with brain-tendency.

9. That, in short, the whole ascertained record of evolution leads us to deny : (1) the possible existence of any creature not bound to act, think and feel, according to its innate physical idiosyncrasy : (2) the possible existence of a human being whose actions and thoughts are modifiable by any influence except environment, and corollarily, who is endowed with a "free-will" involving the assumption of

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faculty beyond automatic response of organism to external stimulus.

Let the dogmatist controvert, to the satisfaction of reason, these verifications, and we shall hail him as an authority on those subjects beyond the grasp of reason—even then, however, reserving to ourselves the liberty of placing our own value on his testimony.

Postscript.—Since the contents of this volume have been printed, the writer has been gratified by the perusal of Weismann's articles entitled "The All-Sufficiency of Natural Selection" (*Contemporary Review* for September and October, 1893), in which Mr. Spencer's propositions in his articles referred to in this volume are exhaustively met, and the last stronghold of Lamarckism, even to common apprehension, is demolished.

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APPENDIX.

ROMANES AND WEISMANN.

At the moment of his book's going to press, the author has received Professor Romanes' volume, entitled, "An Examination of Weismannism." The writer has had no opportunity of doing more than hurriedly glance at its contents. From what he has read and considered, he is led to suppose that Professor Romanes' scrutiny is largely influenced by bias towards certain hypotheses of his own, and that, on this account, there are features in his critical method with regard to Weismann which tend to inspire mistrust of his conclusions. The writer will, in the course of these few pages, endeavour to justify this expression of opinion.

As to the writer's application of Weismannism to his own doctrines, it may be well at once to state that Professor Romanes' arguments only tend to confirm the correctness of that application. All that Professor Romanes proves, if all his conclusions are accepted by scientists as valid, is that extraneous influence may affect the elements of reproduction in a manner different from that assumed by Weismann. Professor Romanes maintains that Weismann's proposition of hereditary elements as being concentrated in the nucleus of only special cells is error. According to the Professor, the hereditary element is present in all cells. Instead of being *absolutely* stable as (so the Professor claims, although this is repudiated by Weismannism) is Weismann's germ-plasm, this other hereditary element is

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only *almost* absolutely stable, and, being present in all parts of the organism, accordingly renders that organism *almost absolutely* indifferent, hereditarily, to external influence. As regards degrees of susceptibility to external influence, there seems no appreciable difference between Weismann's germ-plasm and Romanes' pangenes or promiscuous germs. It will be seen that the criticism of Professor Romanes has no bearing on the application of the Lamarckian theory to the effects of culture and personal effort. Moreover, before any use of Professor Romanes' doctrine could be made by the Lamarckian sociologist, this altogether distinct hypothesis would need to be established: that *the effects of "use" corresponded with the "use."* This point has already been strongly emphasized by the writer, and, as he reads Professor Romanes, he interprets him to deny the possibility of any such correspondence. Professor Romanes propounds an indiscriminate diffusion of hereditary elements (Pangenesis). The writer would like to know what he has to say respecting Boveri's experiment (see pages 171, 181, 185, 189 of this work); respecting the case of *Volvocinæ* (page 195); the cessation of reproductive energy in a healthy woman (page 169). Again, is not the above evidence for Weismannism far stronger than that assumed so destructive by Professor Romanes: the supposed "occasional effect of pollenization on the somatic tissues of plants"? So far as the writer knows, Professor Romanes has taken no notice of any of the foregoing confirmatory evidence for Weismannism. Again, Professor Romanes repeatedly asserts that Weismann affirms invariability of organisms which are produced parthenogenetically. Weismann *did* affirm this. He does so no longer. "But something . . has been proved; for we can safely affirm *that in parthenogenesis individual variation exists, which, as in bisexual reproduction, has its foundation in the composition of the germ-plasm itself, and thus depends on heredity,*

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and is itself inheritable." (Italics Weismann's.) "I thus erred in former times, in believing that purely parthenogenetic species entirely lacked the capability of transformation by means of selection; they do possess this power to a certain extent." (Essays, Vol. II., page 166.) Again, Professor Romanes repeatedly asserts that Weismann attributes congenital variation solely to amphimixis, and the professor is very severe on Weismann because he has, in his latest work, assumed the possibility of variation independently of amphimixis. In an essay delivered *thirteen years* ago is the following: "But even if, as seems at present very probable, sexual reproduction is not the only origin of individual variability in the Metazoa, no one will deny that it is the chief means of increasing these variations and of continuing them in favourable proportions. In my opinion, the importance of the *rôle* which sexual reproduction plays in shaping the material for the process of selection is scarcely diminished, even if we concede that some amount of individual variability can be called forth by direct influences on the germ-plasm. (Essays, Vol. II., page 95.) If we now contrast the above with a quotation from Professor Romanes, we may further justify ourselves in the assumption above expressed that Professor Romanes has a pet case of his own to which he is desirous of doing full justice. "The assumption is, that although germ-plasm is universally unstable, the degree of its instability is everywhere restricted within the narrowest possible limits—so that sexual propagation is still necessary for the purpose of *developing* congenital variations to the point where they can fall within the range of natural selection, notwithstanding that they must all have been *originated* by external causes acting directly on a germ-plasm universally unstable within the narrow limits assigned. But clearly this assumption is arbitrary to the last degree, and, no less clearly, it is made by Weismann *for the sole purpose of saving as much as he*

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can of his previous theory of variation. His more recent speculations touching the mechanism of heredity are incompatible with his former view of amphimixis as the (italics above, writer's) *sole* (italics here Professor Romanes') *cause of congenital variations, and therefore he makes this arbitrary assumption for the purpose of representing that amphimixis may nevertheless still be regarded as a* (italics above, writer's) *necessary con-cause.*" (italics here Professor Romanes'.) The Professor is very eager to bag the quarry. The writer fancies that, in the end, the quarry will bag the Professor! *Nous verrons.*

The writer must confess that Weismann's objectivity of standpoint impresses him more forcibly than does the fervid method of Professor Romanes. This objectivity of standpoint, as Mr. Robertson has well pointed, is as characteristic of Weismann as of Darwin. We may obtain a fair idea of this contrast of method by comparing such a characteristic utterance as the following with the above "cock-crow" of Professor Romanes. This quotation appears on page 176 of the first volume of essays and is *dated* 1885. "It is nevertheless possible that continuity of the germ-plasm does not exist in the manner in which I imagine that it takes place, for no one can at present decide whether all the ascertained facts agree with and can be explained by it. Moreover, the ceaseless activity of research brings to light new facts every day, and I am far from maintaining that my theory may not be disproved by some of these. But even if it should have to be abandoned at a later period, it seems to me that, at the present time, it is a necessary stage in the advancement of our knowledge, and one which must be brought forward and passed through, whether it prove right or wrong, in the future. In this spirit I offer the following considerations, and it is in this spirit that I should wish them to be received." The writer would require strong evidence to convince him that a brain

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which approaches its studies in the manner of Weismann's is the brain of a man who will flippantly alter his deliberate propositions "for the sole purpose of saving a much as he can of his previous theory."

It seems, to the writer, that Professor Romanes has a grievance against Weismann for his theory-development, inasmuch as it tends to thwart Professor Romanes' "purpose of saving as much as he can of his (too ?) previous" criticism! Professor Romanes' work is largely composed of statements and criticisms of propositions as of Weismann which he (Weismann) has long since discarded and, for discarding which, Weismann has given such adequate reason, as to constitute a waste of effort for both writer and reader, that any criticism should now concern itself with such discarded propositions. On the other hand, it is comparatively easy work to demolish propositions which their author has already demolished! The writer thinks that Professor Romanes' criticism would have proved more permanently valuable had he concerned himself less with jubilantly giving prominence to what Weismann had discarded, and more fully, with impartially stating and examining the great mass of evidence from his own and others' observations on cell-development which Weismann adduces in support of his latest conclusions. However, this is a matter with which Weismann himself will probably deal satisfactorily to himself if not to his critic. To give one from among a number of significant examples of the procedure of the Professor : Weismann's latest views on the subject of the extrusion of polar bodies are dismissed (see page 40) with the curtest reference, while great prominence is given to his views discarded so long ago as 1891 (see Essays, Vol. II, page 122, also pages 23 and 176-9 of this work), or rather, this prominence is given to Professor Romanes' criticism of certain inadequately stated propositions of Weismann. Only one scientist, so far as the writer knows,

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has displayed, with regard to his own theories, impartiality equal to Weismann's. This is additionally noteworthy since Weismann's work is of so highly speculative a nature as to offer more than ordinary immunity and inducement to an investigator prone to subjectivity and in love with his own theories rather than with truth. That Weismann tries to accommodate his hypotheses to fact rather than the reverse, is surely an admirable procedure. To judge from some parts of his criticism, Professor Romanes considers such procedure, on the part of Weismann, akin to criminal.

As will be clear to the reader of this book, the main concern of the writer, with Weismann's theory, is the confirmation it affords to his views that the effects of culture and effort, whatever they may be on the individual, are powerless to hereditarily affect offspring. If it were proved that they *could* thus affect offspring, the writer would then fall back on his further proposition that such hereditary effect on offspring could not *correspond* with the influence, and that unless such correspondence could be proved scientifically, it would be against social expediency that it should be assumed. The writer has already stated that no such assumption is deducible, even from the adverse criticism of Weismann's theory by Professor Romanes; he will now append some remarks of the Professor touching the main point at issue, so far as he is concerned. First, the writer will show that Professor Romanes does not countenance the assumption of *correspondence*. "For even though the isolation be frequently invaded by influences of body-changes on the congenital characters of this substance" (hereditary) "it does not follow that the body-changes must be transmitted to offspring exactly as they occurred in parents. They may produce in offspring what we have agreed to call 'specialized' hereditary changes, even if they never produce 'representative'" (corresponding) "hereditary

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changes." (Page 104.) From the foregoing, it will be seen that we may as well infer degenerative heredity, as the reverse, from the inherited effects, if such effects could occur, of culture or personal effort.

We will now show to what extent Professor Romanes admits the *possibility* of somatogenetic heredity. For this purpose we will give a quotation from Galton as being representative of Professor Romanes' own views on this subject. This quotation appears on page 60 of "An Examination of Weismannism." "The conclusion to be drawn from the foregoing arguments is, that we might almost reserve our belief that the structural (*i.e.* 'somatic') cells can react on the sexual elements at all, and we may be confident that at the most they do so in a very faint degree; in other words, that acquired modifications are barely, if at all, inherited, in the correct sense of that word." It will be seen that there is small hope for the Lamarckian sociologists, even from the opponents of Weismann.

The writer is now awaiting with interest the reply of Weismann to Professor Romanes. In the meantime, enough has been written in this work to show that, whatever may be the issue as between Weismann and Romanes, so far, nothing has been advanced not confirmatory of the sociological and ethical doctrines propounded in this volume. As to Weismann's main doctrine, the writer believes that it is merely passing through the transitory stages of critical onslaught as did Darwin's, and that, ultimately, it will emerge as triumphant as did Darwin's. On the other hand, the severer the criticism, the better will intellectual sensualism like the doctrine, if it survives. If it falls—still great is the "Truth" of Intellectual Sensualism!

I do not know from what source Professor Romanes has obtained the extract cited on pages 186-8, as from Weismann's reply to Professor Vines; but, it differs materially

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from what appears on pages 82-4 of the second volume of Essays. To point one instance: on the last three lines of page 186 of Professor Romanes' book, a passage is rendered as being from Weismann: . . . "that the nuclear substance, the chromatin of the nuclear loops, was the *carrier of heredity*." On page 83 of the second volume of Weismann's Essays the passage appears as: "that the substance of the egg-nucleus, or, more precisely, the chromatin of the nuclear loops, formed the *material basis of heredity*." The writer has italicized those words to which he wishes particularly to draw the reader's attention in both quotations. Now, let us note this. In his comment on this controversy between Professor Vines and Weismann, Professor Romanes observes (page 189): "The difficulty is, in Vines' words above cited, 'to conceive that the germ-plasm of the ovum can impress upon the somato-plasm of the developing embryo the hereditary characters of which it (the germ-plasm) *is the bearer*.'" Again, the writer has italicized to call the reader's attention. Now, "the germ-plasm of the ovum" is *not* the "bearer of hereditary characters," at least not according to Weismann's remarks in the Essay quoted above. Nor, again, is it the "bearer," according to another quotation which shall now be given: . . . "for it has not been asserted that the nucleus alone is the bearer of the hereditary characters . . . but that the nucleus alone *contains* the hereditary substance." ("The Germ-plasm," page 26.) The writer has, again, italicized in the above. Now, it is evident that Weismann sees a great difference between statements which assert that the nucleus is the *bearer* of hereditary qualities and, that the nucleus *contains* the hereditary substance. Under these circumstances the writer would like to know how Professor Romanes came to cite the quotation as it does not appear in the Essay, and as Weismann evidently does not intend it to appear. Let us now see whether this distinction has

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any real validity, or is merely a distinction without a difference.

A certain combination of gases constitutes water; but, these gases, separated, are no longer water. Similarly, a certain combination of organisms composed of biophors, which organisms are called by Weismann, determinants, is germ-plasm. But, when these determinants are no longer combined, but are, to any extent, disintegrated, the resultant is no longer germ-plasm, but another sort of plasm called by Weismann idio-plasm of a certain ontogenetic stage, and disintegrated determinants, or individually energizing biophors. Again, if these biophors, by their individual activities, cause somato-plasm to develop in a certain manner, these biophors do not on that account become somato-plasm. Hence germ-plasm may determine the character of somatic development without ever losing its validity as a factor entirely distinct from somato-plasm. To state the case in another way: The nucleus of a germ-cell has reached such a stage of development that it causes that cell to divide. Coincidently with this division, certain contents (determinants) of this nucleus have so developed that they become disintegrated into biophors which swarm through the nuclear membrane into each product of division. Then, there would remain in such divided nucleus, not all its original constituents, but, so many less as those gone to control the cell. Again, these biophors which originally were constituents of the germ-plasm, or, as the case may be, of any later stage of idio-plasm, would not become *transformed* into the somato-plasm or cell-body. As biophors of a germ-cell they would be as distinct from the body-material of the cell while struggling in it, as they were, when quiescent in the original germ-plasm. Again, as these biophors in their struggles constitute heredity itself, it will be seen that it may involve quite an erroneous conclusion to assert that the nucleus is

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the carrier of heredity. This will be made further clear by the following quotation, page 189, from Professor Romanes' work: "For whether we thus follow Weismann's earlier terminology or his later, we are so far speaking about exactly the same thing, namely, the transformation of 'germ-plasm' into all the constituent cells of the soma." We are, according to Weismann, doing nothing of the sort. We are not speaking of the "transformation" of germ-plasm at all. We are speaking of the individual energies of factors, biophors, totally distinct from the soma in which they energize.

The following additional quotation from Professor Vines (page 188 of Professor Romanes' book) will prove conclusively that both these gentlemen have ideas in regard to Weismann's germ-plasm, which Weismann himself does not entertain. "The fate of the germ-plasm of the fertilized ovum is, according to Professor Weismann, to be converted in part into somato-plasm (!)"—note of exclamation Vines' —"of the embryo." It will be seen that Professors Romanes and Vines are here putting up skittles of their own and fathering them on Weismann! It seems to the writer that in regard to such important issues as are involved in Weismann's theory, it is very desirable that eminent critics, before they publicly cast the weight of their reputations for or against, should have a fairly clear conception of the fundamental propositions which they profess to scrutinize!

In respect to scientific problems of vast importance, the writer dissents from critical procedure which concerns itself, as does a barrister, more with damaging the opposition than with eliciting truth. Scientific criticism should be relentless, but it should not be perpetually waving aloft its brief. Of course, taken in the mass, scientific criticism does undoubtedly, in the highest degree possible to humanity, exemplify the elimination of the "personal

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equation." But it is very desirable that scientific criticism should do this *individually*, especially when the critic is an acknowledged master in his special walk. As the masses accept as gospel the *ipse dixit* of such a master, it is evident that the manifestation of the benefits of truth, as regards society, may be indefinitely postponed if such a master constitutes himself merely a prosecuting counsel.

The writer has only been able to devote a few hours to examining Professor Romanes' work; nevertheless, he thinks he has shown, if in a merely desultory fashion, that the method of the Professor partakes too prominently of the forensic, to be the ideal of scientific criticism. Professor Romanes' volume contains 189 pages of matter relating particularly to Weismann. Of these, 116 pages are devoted to theories propounded by Weismann up to 1891. The remaining pages are devoted to Weismannism "up to date" (1893). I maintain that this procedure tends to veil the vital issues; it involves a redundancy of critical energy prejudicial to the establishment of truth. To "flog a dead dog" is, in this case, more than merely useless; it is obstructive to the best interests of society. All that the world is concerned with is Weismann's theory "up to date." Had Professor Romanes concerned himself mainly with this, the writer thinks the result would have been more permanently consistent with the Professor's eminence as a scientist, though the display of energy involved in the flogging of Weismann's "dead dogs" would, necessarily, have been foregone.

Even in this business of "flogging dead dogs," the Professor does not limit himself to flogging Weismann's defunct animals, but he provides some of his (Romanes') own construction, which he belabours as vigorously as Weismann's! We have already given a few instances, some of which are perhaps attributable to misconception of Weismann's meaning; but what are we to think of such a

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case as this which follows? On page 89 of the Professor's book, headed "Weismann's Theory of Evolution (1891)," appears the following:—"First, he alleges that there is a *total absence* (italics writer's) of variability on the part of all organisms which have been produced parthenogenetically. . . . We may look in vain," he says, "for *any individual differences* (italics writer's) on the part of any multicellular organisms which have been brought into existence independently of the blending of germ-plasms in a previous act of sexual union." Now, let us carefully note the following. In Weismann's twelfth essay, the published version of which is dated *September 12th*, 1891 (Vol. 2, page 160), is this: "But now the case is different, and we may affirm that in parthenogenetic generations, the combination of idants *in the different germ-cells of one and the same mother can vary. We can therefore attribute even to parthenogenetic species a certain power of varying* (italics writer's), although not to anything like the same extent as in bisexual species." Now, what reliance can we place on criticism which propounds as a part of "Weismann's Theory of Evolution (1891)" what in Weismann's essay, dated 1891, is distinctly denied?

It may be here stated that Weismann, even in his earliest essays, *prior* to 1891, did not attribute a "total absence of variability" of every kind to parthenogenetic species. He showed that such species might vary individually, but not phyletically or typically. That is: certain potentialities of variation might be derived by each individual from more primitive ancestors, but those potentialities could never exceed their original *range* so as to establish *new species*. Therefore, what Professor Romanes states, as above, is not even Weismann's theory *prior* to 1891. To sum up, for the present: Professor Romanes' criticism explains very little, ignores the strongest evidence for Weismann, and is too often mere dialectical strategy.

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Weismann's theory explains the fundamental phenomena of heredity and evolution, with which it is consistent. Both investigations—the one, practically; the other, absolutely—deny the possibility of hereditary transmission through the soma.

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